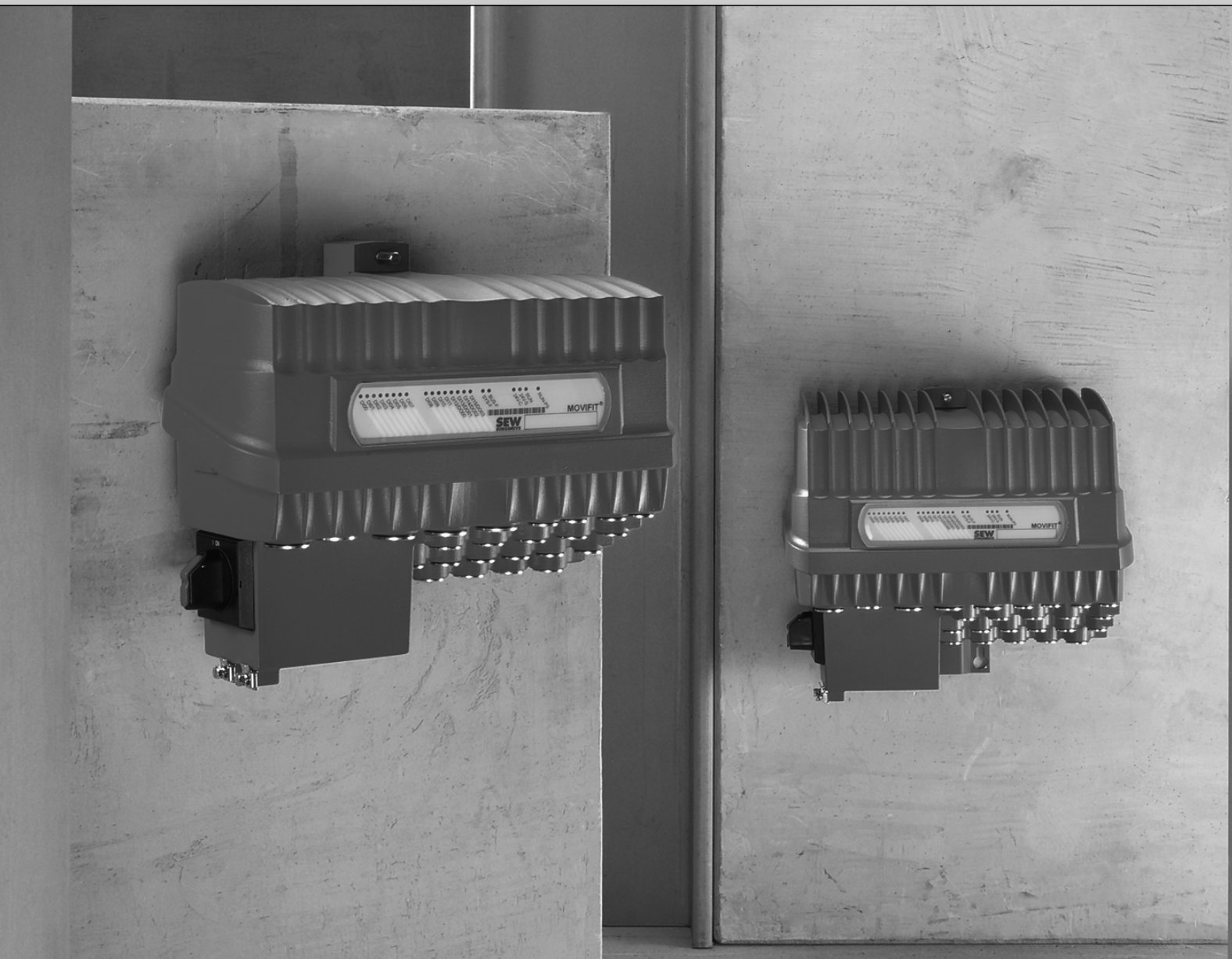




**SEW**  
**EURODRIVE**

# Manual



**MOVIFIT® Function Level "Technology" with Fieldbus  
Interface EtherNet/IP™ or Modbus/TCP**



## Table of contents

|          |                                                                           |           |
|----------|---------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>General information.....</b>                                           | <b>9</b>  |
| 1.1      | About this documentation .....                                            | 9         |
| 1.2      | Structure of the safety notes .....                                       | 9         |
| 1.2.1    | Meaning of signal words .....                                             | 9         |
| 1.2.2    | Structure of section-related safety notes.....                            | 9         |
| 1.2.3    | Structure of embedded safety notes .....                                  | 10        |
| 1.3      | Rights to claim under limited warranty .....                              | 11        |
| 1.4      | Exclusion of liability .....                                              | 11        |
| 1.5      | Other applicable documentation .....                                      | 11        |
| 1.6      | Product names and trademarks.....                                         | 11        |
| 1.7      | Copyright notice .....                                                    | 11        |
| <b>2</b> | <b>Safety notes .....</b>                                                 | <b>12</b> |
| 2.1      | Preliminary information .....                                             | 12        |
| 2.2      | General information .....                                                 | 12        |
| 2.3      | Target group .....                                                        | 13        |
| 2.4      | Fieldbus systems .....                                                    | 13        |
| 2.5      | Functional safety.....                                                    | 13        |
| 2.6      | Lifting applications .....                                                | 14        |
| <b>3</b> | <b>Introduction.....</b>                                                  | <b>15</b> |
| 3.1      | Content of this documentation .....                                       | 15        |
| 3.2      | Short designation in the documentation.....                               | 15        |
| 3.3      | MOVIFIT® function level .....                                             | 15        |
| 3.4      | Application modules in MOVITOOLS® MotionStudio .....                      | 16        |
| 3.4.1    | Engineering with MOVITOOLS® MotionStudio.....                             | 16        |
| 3.4.2    | Application modules for a parameterizable unit .....                      | 17        |
| 3.4.3    | Available application modules.....                                        | 18        |
| 3.5      | Free programming via MOVI-PLC® .....                                      | 20        |
| 3.5.1    | Advantages of MOVI-PLC® .....                                             | 20        |
| 3.5.2    | Motion libraries for MOVIFIT® function level "Technology" .....           | 21        |
| <b>4</b> | <b>Startup .....</b>                                                      | <b>22</b> |
| 4.1      | Startup procedure for MOVIFIT® FC and SC .....                            | 22        |
| 4.2      | Startup procedure for MOVIFIT® MC .....                                   | 23        |
| 4.3      | Startup procedure with encoder.....                                       | 23        |
| <b>5</b> | <b>Installation notes .....</b>                                           | <b>24</b> |
| 5.1      | Industrial Ethernet networks .....                                        | 24        |
| 5.1.1    | TCP/IP addressing and subnetworks.....                                    | 24        |
| 5.1.2    | Connection to the Ethernet network.....                                   | 26        |
| 5.2      | Setting the IP address parameters .....                                   | 28        |
| 5.2.1    | Initial startup.....                                                      | 28        |
| 5.2.2    | Changing the IP address parameters after successful initial startup ..... | 28        |
| 5.2.3    | Deactivating/activating the DHCP .....                                    | 29        |
| 5.2.4    | Address Editor from SEW-EURODRIVE.....                                    | 29        |
| 5.2.5    | Setting the IP address parameter to the default value .....               | 29        |

|          |                                                                 |           |
|----------|-----------------------------------------------------------------|-----------|
| 5.2.6    | Replacement procedure .....                                     | 29        |
| 5.3      | Connection MOVIFIT® unit – Ethernet .....                       | 30        |
| 5.3.1    | X30/X11, X31/X12: Ethernet interface .....                      | 31        |
| 5.3.2    | X11, X12: Ethernet interface .....                              | 33        |
| 5.3.3    | External SBus connection to MOVIFIT® slaves .....               | 33        |
| 5.3.4    | Setting the DIP switches in the EBOX .....                      | 36        |
| 5.3.5    | Status LEDs .....                                               | 37        |
| <b>6</b> | <b>Configuration and startup of EtherNet/IP™ .....</b>          | <b>46</b> |
| 6.1      | Device description file for EtherNet/IP™ (EDS file) .....       | 46        |
| 6.2      | Configuration of the EtherNet/IP™ master .....                  | 46        |
| 6.2.1    | Configuration with RSLogix 5000 up to version V19 .....         | 47        |
| 6.2.2    | Configuration with RSLogix 5000 as of version V20 .....         | 50        |
| 6.3      | Device Level Ring topology .....                                | 53        |
| 6.3.1    | Description .....                                               | 53        |
| 6.3.2    | Ring fault detection .....                                      | 53        |
| 6.3.3    | Ring fault rectification .....                                  | 53        |
| 6.3.4    | Hardware and software configuration .....                       | 54        |
| 6.4      | Requirements to the MOVIFIT® unit for fieldbus operation .....  | 54        |
| 6.5      | Project planning examples .....                                 | 55        |
| 6.5.1    | Configuring process data exchange .....                         | 55        |
| 6.5.2    | Access to device parameters with RSLogix 5000 .....             | 58        |
| <b>7</b> | <b>Ethernet Industrial Protocol (EtherNet/IP™) .....</b>        | <b>75</b> |
| 7.1      | Description .....                                               | 75        |
| 7.2      | Process data exchange .....                                     | 75        |
| 7.3      | Timeout response .....                                          | 75        |
| 7.4      | CIP object directory .....                                      | 76        |
| 7.4.1    | Identity object .....                                           | 77        |
| 7.4.2    | Message router object .....                                     | 78        |
| 7.4.3    | Assembly object .....                                           | 79        |
| 7.4.4    | Register object .....                                           | 80        |
| 7.4.5    | Parameter object .....                                          | 83        |
| 7.4.6    | Vardata object .....                                            | 86        |
| 7.4.7    | TCP/IP interface object .....                                   | 87        |
| 7.4.8    | EtherNet link object .....                                      | 88        |
| 7.4.9    | Return codes for parameterization via "explicit messages" ..... | 89        |
| 7.5      | Technical data of the EtherNet/IP™ interface .....              | 92        |
| <b>8</b> | <b>Configuration and startup of Modbus/TCP .....</b>            | <b>93</b> |
| 8.1      | Device description file for Modbus/TCP .....                    | 93        |
| 8.2      | Configuration of the Modbus/TCP master .....                    | 93        |
| 8.2.1    | Configuring hardware (control structure) .....                  | 94        |
| 8.2.2    | Setting Ethernet component .....                                | 95        |
| 8.2.3    | Addressing drive via the "IO Scanning" function .....           | 96        |
| 8.3      | Requirements to the MOVIFIT® unit for fieldbus operation .....  | 97        |
| 8.4      | Project planning examples .....                                 | 97        |
| 8.4.1    | Configuring process data exchange .....                         | 97        |



|           |                                                                              |            |
|-----------|------------------------------------------------------------------------------|------------|
| 8.4.2     | Data exchange via Modbus/TCP .....                                           | 98         |
| <b>9</b>  | <b>Modbus protocol (Modbus/TCP) .....</b>                                    | <b>104</b> |
| 9.1       | Description .....                                                            | 104        |
| 9.1.1     | Mapping and addressing .....                                                 | 104        |
| 9.1.2     | Services (function codes) .....                                              | 105        |
| 9.1.3     | Accessing services .....                                                     | 105        |
| 9.2       | Protocol structure .....                                                     | 105        |
| 9.2.1     | Header .....                                                                 | 106        |
| 9.2.2     | Service FC3 – Read holding registers .....                                   | 107        |
| 9.2.3     | Service FC16 – Write multiple registers .....                                | 108        |
| 9.2.4     | Service FC23 – Read/write multiple registers .....                           | 109        |
| 9.2.5     | Service FC43 – Read device identifications .....                             | 110        |
| 9.3       | Connection management .....                                                  | 111        |
| 9.3.1     | Sending process output data (requirements of a controlling connection) ..    | 111        |
| 9.3.2     | Closing a connection .....                                                   | 112        |
| 9.3.3     | Timeout behavior .....                                                       | 112        |
| 9.4       | Parameter access via Modbus/TCP .....                                        | 113        |
| 9.4.1     | Procedure with FC16 and FC03 .....                                           | 113        |
| 9.4.2     | Procedure with FC23 .....                                                    | 113        |
| 9.4.3     | Protocol structure .....                                                     | 114        |
| 9.4.4     | MOVILINK® parameter channel .....                                            | 114        |
| 9.5       | Fault codes (exception codes) .....                                          | 116        |
| 9.6       | Technical data, Modbus/TCP interface .....                                   | 117        |
| <b>10</b> | <b>Error diagnostics for operation on EtherNet/IP™ and Modbus/TCP .....</b>  | <b>118</b> |
| 10.1      | Checking the status LEDs of the unit .....                                   | 118        |
| 10.2      | Checking the status LED and the status display at the fieldbus master .....  | 119        |
| 10.3      | Checking the fault sources .....                                             | 119        |
| <b>11</b> | <b>Process data description in transparent mode .....</b>                    | <b>120</b> |
| 11.1      | Process image .....                                                          | 120        |
| 11.2      | Status word of the MOVIFIT® unit .....                                       | 121        |
| 11.3      | Digital inputs/outputs .....                                                 | 123        |
| 11.4      | Process data between a MOVIMOT® inverter and MOVIFIT® MC .....               | 124        |
| 11.4.1    | Assignment of MOVIMOT® control word .....                                    | 124        |
| 11.4.2    | Coding of the speed setpoint .....                                           | 125        |
| 11.4.3    | Coding of the ramp .....                                                     | 125        |
| 11.4.4    | Assignment of MOVIMOT® status word 1 .....                                   | 125        |
| 11.4.5    | Coding of the current value .....                                            | 126        |
| 11.4.6    | Assignment of MOVIMOT® status word 2 .....                                   | 126        |
| 11.5      | Process data between the integrated motor starter and MOVIFIT® SC .....      | 127        |
| 11.5.1    | Assignment of MOVIFIT® SC control word .....                                 | 127        |
| 11.5.2    | Assignment of MOVIMOT® SC status word .....                                  | 128        |
| 11.5.3    | Coding of the current value .....                                            | 129        |
| 11.6      | Process data between the integrated frequency inverter and MOVIFIT® FC ..... | 129        |
| 11.6.1    | Assignment of MOVIFIT® FC control word .....                                 | 130        |
| 11.6.2    | Coding of the speed setpoint .....                                           | 131        |

|           |                                                                            |            |
|-----------|----------------------------------------------------------------------------|------------|
| 11.6.3    | Coding of the ramp.....                                                    | 131        |
| 11.6.4    | Assignment of status word 1 for MOVIFIT® FC .....                          | 132        |
| 11.6.5    | Coding of the current value .....                                          | 132        |
| 11.6.6    | Assignment of status word 2 for MOVIFIT® FC .....                          | 133        |
| 11.7      | Process data between a MOVIFIT® slave and MOVIFIT® SC/FC .....             | 134        |
| <b>12</b> | <b>Operation of MOVITOOLS® MotionStudio .....</b>                          | <b>135</b> |
| 12.1      | Preparations at the MOVIFIT® unit .....                                    | 135        |
| 12.2      | About MOVITOOLS® MotionStudio .....                                        | 136        |
| 12.2.1    | Tasks.....                                                                 | 136        |
| 12.2.2    | Communication channels.....                                                | 136        |
| 12.2.3    | Functions with the units.....                                              | 136        |
| 12.3      | First steps .....                                                          | 137        |
| 12.3.1    | Starting the software and creating a project.....                          | 137        |
| 12.3.2    | Establishing communication and scanning the network.....                   | 137        |
| 12.3.3    | Connection mode .....                                                      | 137        |
| 12.3.4    | Configuring units .....                                                    | 140        |
| 12.4      | Serial communication (RS485) via interface adapters.....                   | 141        |
| 12.4.1    | Engineering via interface adapter (serial) .....                           | 141        |
| 12.4.2    | Startup of the USB11A interface adapter.....                               | 141        |
| 12.4.3    | Configuring the serial communication .....                                 | 144        |
| 12.5      | Communication via Ethernet.....                                            | 148        |
| 12.5.1    | Connecting the service interface of the MOVIFIT® unit to the PC/laptop ... | 148        |
| 12.5.2    | Address Editor.....                                                        | 149        |
| 12.5.3    | Setting the engineering PC appropriately for the network.....              | 151        |
| 12.5.4    | Configuring the communication channel via Ethernet.....                    | 152        |
| 12.6      | Executing functions with the units.....                                    | 156        |
| 12.6.1    | Reading or changing unit parameters .....                                  | 156        |
| 12.6.2    | Starting up units (online) .....                                           | 157        |
| 12.6.3    | Configuration and diagnostics in transparent mode.....                     | 157        |
| <b>13</b> | <b>Parameterizing the power section .....</b>                              | <b>158</b> |
| 13.1      | Motor/brake startup with MOVIFIT® SC .....                                 | 158        |
| 13.1.1    | Parameter 200 – Nominal line voltage .....                                 | 158        |
| 13.1.2    | Parameter 620/621 – Digital outputs DB00/DB01.....                         | 159        |
| 13.1.3    | Parameter 700 – Operating mode.....                                        | 159        |
| 13.1.4    | Parameter 736/737 – Rated brake voltage drive 1/2 .....                    | 160        |
| 13.2      | Motor/brake startup with MOVIFIT® FC .....                                 | 161        |
| 13.3      | Parameter list for the MOVIFIT® SC power section .....                     | 172        |
| 13.4      | Parameter description for MOVIFIT® SC .....                                | 176        |
| 13.4.1    | 0.. Display values .....                                                   | 176        |
| 13.4.2    | 1.. Setpoint/ramp generators.....                                          | 178        |
| 13.4.3    | 2.. Power supply .....                                                     | 179        |
| 13.4.4    | 3.. Motor parameters.....                                                  | 179        |
| 13.4.5    | 6.. Terminal assignment.....                                               | 180        |
| 13.4.6    | 7.. Control functions .....                                                | 181        |
| 13.4.7    | 8.. Unit functions .....                                                   | 183        |

|           |                                                                                             |            |
|-----------|---------------------------------------------------------------------------------------------|------------|
| 13.5      | Parameter list for the MOVIFIT® FC power section .....                                      | 185        |
| 13.6      | Parameter description for MOVIFIT® FC .....                                                 | 194        |
| 13.6.1    | 0.. Display values .....                                                                    | 194        |
| 13.6.2    | 1.. Setpoint/ramp generators.....                                                           | 197        |
| 13.6.3    | 3.. Motor parameters.....                                                                   | 199        |
| 13.6.4    | 5.. Control functions .....                                                                 | 201        |
| 13.6.5    | 6.. Terminal assignment.....                                                                | 202        |
| 13.6.6    | 7.. Control functions .....                                                                 | 203        |
| 13.6.7    | 8.. Unit functions .....                                                                    | 205        |
| <b>14</b> | <b>Configuration in transparent mode.....</b>                                               | <b>208</b> |
| 14.1      | "Transparent mode" application module .....                                                 | 208        |
| 14.2      | Starting the Gateway Configurator.....                                                      | 209        |
| 14.3      | Activating the basic functions.....                                                         | 210        |
| 14.3.1    | Performing an auto setup .....                                                              | 211        |
| 14.3.2    | Displaying the process data exchange .....                                                  | 212        |
| 14.3.3    | Process image examples .....                                                                | 214        |
| 14.4      | Activating the advanced functions .....                                                     | 215        |
| 14.4.1    | Opening the parameter tree .....                                                            | 215        |
| 14.4.2    | Diagnostics of the S12 safety option .....                                                  | 216        |
| 14.4.3    | Unit diagnostics with the 12-byte MOVILINK® parameter channel.....                          | 221        |
| 14.5      | Replacing units .....                                                                       | 236        |
| 14.5.1    | Replacing the same MOVIFIT® function level "Technology" .....                               | 236        |
| 14.5.2    | Replacing MOVIFIT® function level "Classic" with MOVIFIT® function level "Technology" ..... | 238        |
| 14.6      | Fault diagnostics .....                                                                     | 239        |
| <b>15</b> | <b>Parameterization and manual mode with the DBG keypad .....</b>                           | <b>241</b> |
| 15.1      | DBG keypad – description: .....                                                             | 241        |
| 15.1.1    | Function .....                                                                              | 241        |
| 15.1.2    | Characteristics .....                                                                       | 241        |
| 15.1.3    | Keypad variants .....                                                                       | 241        |
| 15.1.4    | DBG – key assignment .....                                                                  | 242        |
| 15.1.5    | Connecting the DBG keypad.....                                                              | 243        |
| 15.2      | Operating the MOVIFIT® unit with the DBG keypad .....                                       | 244        |
| 15.2.1    | Selecting a language.....                                                                   | 244        |
| 15.2.2    | DBG context menu.....                                                                       | 244        |
| 15.2.3    | Activating manual operation .....                                                           | 245        |
| 15.2.4    | Copying the parameter set.....                                                              | 246        |
| 15.3      | Operating MOVIFIT® SC with the DBG keypad .....                                             | 247        |
| 15.3.1    | Selecting MOVIFIT® SC power section .....                                                   | 247        |
| 15.3.2    | Basic display .....                                                                         | 247        |
| 15.3.3    | Setting parameter mode.....                                                                 | 248        |
| 15.3.4    | Manual operation .....                                                                      | 250        |
| 15.4      | Operating MOVIFIT® FC with the DBG keypad .....                                             | 255        |
| 15.4.1    | Selecting MOVIFIT® FC power section .....                                                   | 255        |
| 15.4.2    | Basic display .....                                                                         | 255        |

|           |                                                 |            |
|-----------|-------------------------------------------------|------------|
| 15.4.3    | Setting parameter mode.....                     | 256        |
| 15.4.4    | Manual operation .....                          | 258        |
| 15.5      | Operating MOVIFIT® MC with the DBG keypad ..... | 261        |
| 15.5.1    | Selecting MOVIFIT® MC power section.....        | 261        |
| 15.5.2    | Executing other functions.....                  | 261        |
| <b>16</b> | <b>Service.....</b>                             | <b>262</b> |
| 16.1      | Fault list MOVIFIT® MC .....                    | 262        |
| 16.2      | Fault list MOVIFIT® SC .....                    | 263        |
| 16.3      | Fault list MOVIFIT® FC .....                    | 266        |
| 16.4      | Transparent mode fault list .....               | 270        |
| 16.4.1    | Notes .....                                     | 270        |
| 16.4.2    | Fault list.....                                 | 271        |
|           | <b>Index .....</b>                              | <b>272</b> |

## 1 General information

### 1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

### 1.2 Structure of the safety notes

#### 1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

| Signal word        | Meaning                                                             | Consequences if disregarded                    |
|--------------------|---------------------------------------------------------------------|------------------------------------------------|
| <b>▲ DANGER</b>    | Imminent hazard                                                     | Severe or fatal injuries.                      |
| <b>▲ WARNING</b>   | Possible dangerous situation                                        | Severe or fatal injuries.                      |
| <b>▲ CAUTION</b>   | Possible dangerous situation                                        | Minor injuries                                 |
| <b>NOTICE</b>      | Possible damage to property                                         | Damage to the drive system or its environment. |
| <b>INFORMATION</b> | Useful information or tip: Simplifies handling of the drive system. |                                                |

#### 1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



##### **SIGNAL WORD**

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

### Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

| Hazard symbol                                                                       | Meaning                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------|
|    | General hazard                          |
|    | Warning of dangerous electrical voltage |
|    | Warning of hot surfaces                 |
|    | Warning of risk of crushing             |
|   | Warning of suspended load               |
|  | Warning of automatic restart            |

#### 1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

**▲ SIGNAL WORD!** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

### 1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the unit!

### 1.4 Exclusion of liability

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, SEW-EURODRIVE assumes no liability for defects.

### 1.5 Other applicable documentation

This document supplements the operating instructions and limits the application notes according to the following information. Use this document only together with the operating instructions.

Further information can be found in the following publications:

- "MOVIFIT® MC" operating instructions
- "MOVIFIT® SC" operating instructions
- "MOVIFIT® FC" operating instructions
- "MOVIMOT® MM..D" operating instructions
- "MOVIFIT® Functional Safety" manuals
- "MOVITOOLS® MotionStudio" manual/online help
- Manuals for application modules

### 1.6 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

### 1.7 Copyright notice

© 2015 SEW-EURODRIVE. All rights reserved.

Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

## 2 Safety notes

### 2.1 Preliminary information

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the machinery and its operation as well as persons who work on the unit independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

The following safety notes are primarily concerned with the use of the following units: MOVIFIT® FC, SC, MC

If you use other components from SEW-EURODRIVE, also refer to the safety notes for these particular components in the corresponding documentation.

Also observe the additional safety notes provided in the individual chapters of this documentation.

### 2.2 General information



#### ▲ WARNING

Depending on its degree of protection, the unit may have live, uninsulated as well as moving or rotating parts and hot surfaces during operation.

Severe or fatal injuries.

- All work related to transportation, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observance of
  - The relevant detailed documentation(s)
  - The warning and safety signs on the unit
  - All other relevant project planning documents, operating instructions and wiring diagrams
  - The specific regulations and requirements for the system, and
  - The national/regional regulations governing safety and the prevention of accidents.
- Never install damaged products.
- Submit a complaint to the shipping company immediately in the event of damage.

Unauthorized removal of covers, improper use, or incorrect installation and operation may result in severe injury to persons, or damage to machinery.

Refer to the following chapters for more information.



## 2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and servicing of the product, who possess the following qualifications:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with this documentation.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product, who possess the following qualifications:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- They are familiar with this documentation.

In addition to that, they must be familiar with the relevant safety regulations and laws, especially with the requirements of the performance levels according to DIN EN ISO 13849-1 and all other standards, directives and laws specified in this documentation. The above-mentioned persons must have the express authorization of the company to operate, program, parameterize, label and ground units, systems and circuits in accordance with the standards of safety technology.

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately.

## 2.4 Fieldbus systems

A fieldbus system makes it possible to adapt electronic drive components to the particulars of the machinery within wide limits. There is a risk that a change of parameters that cannot be detected externally may result in unexpected (but not uncontrolled) system behavior.

## 2.5 Functional safety

The unit may not perform any safety functions unless they are described and expressly approved.

For safety applications, ensure that the information in the following publications is observed:

- MOVIFIT® – Functional safety

Use only those components in safety applications that were explicitly designed and delivered for this purpose by SEW-EURODRIVE.

## 2.6 Lifting applications

The MOVIFIT® FC frequency inverter with function level "Technology" is not designed for use as a safety device in lifting applications.

Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

Lifting applications can only be implemented under the following conditions:

- Hoist startup has been performed.

### 3 Introduction

#### 3.1 Content of this documentation

This documentation describes the operation of the following units on the fieldbus system EtherNet/IP™ or Modbus/TCP: MOVIFIT® FC, SC, MC.

#### 3.2 Short designation in the documentation

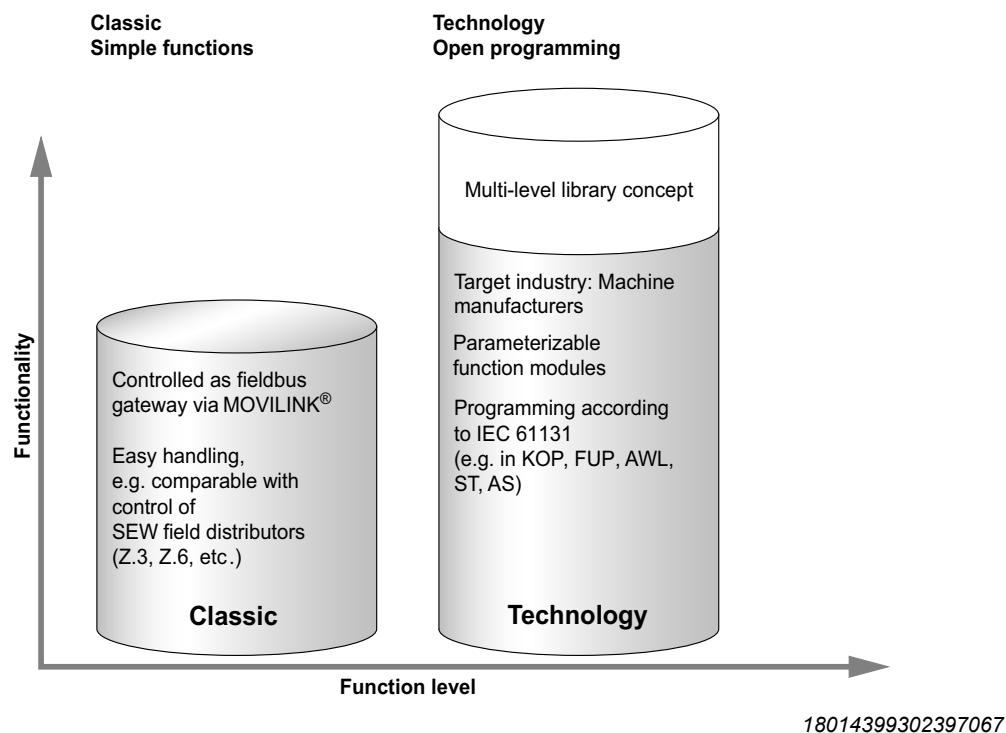
The following short designations are used in this documentation.

| Type designation    | Short designation |
|---------------------|-------------------|
| MOVIFIT® FC, SC, MC | MOVIFIT®          |

#### 3.3 MOVIFIT® function level

The function level describes the functions included in the software for MOVIFIT® units regarding operation, system control and diagnostics.

The following figure gives an overview of the MOVIFIT® function levels:



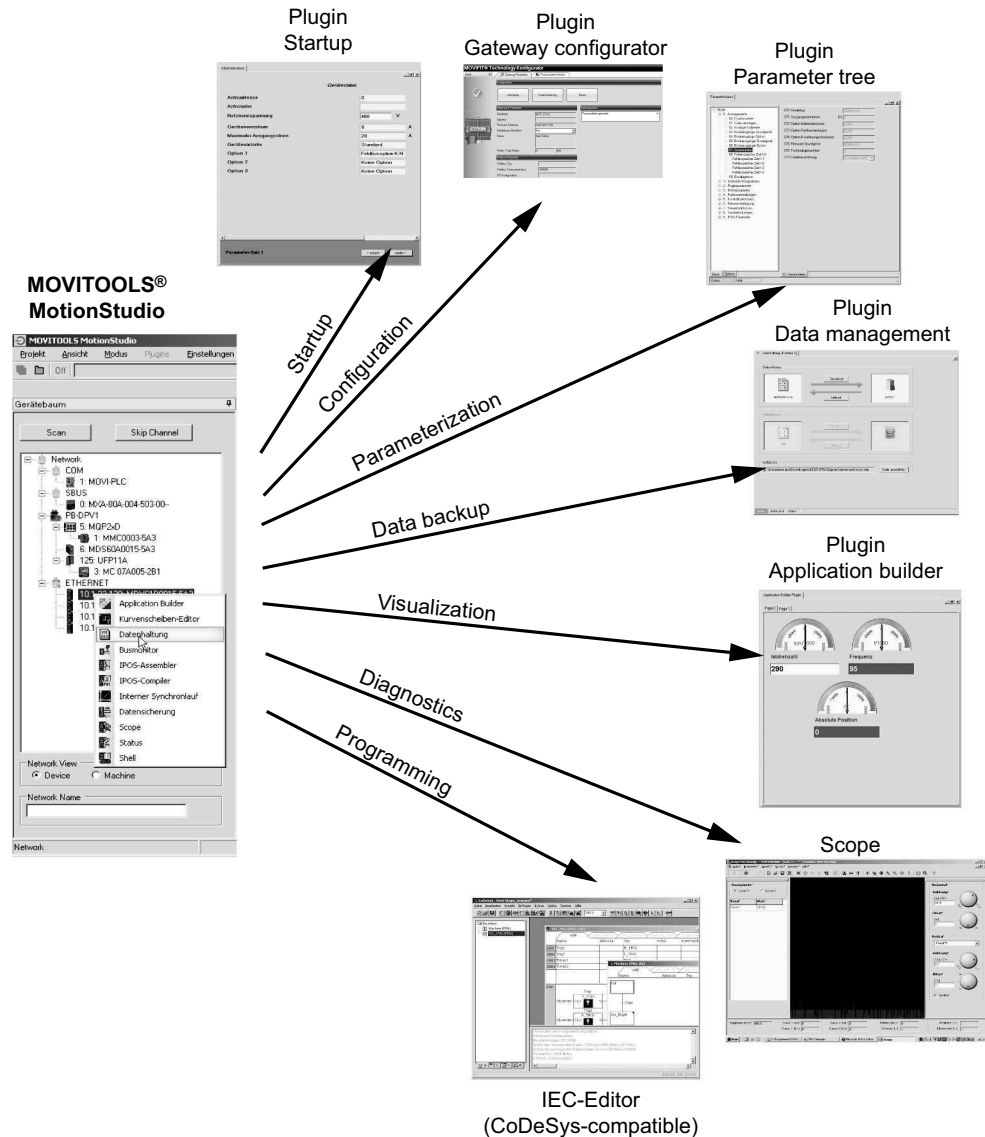
##### Function level "Technology"

MOVIFIT® function level "Technology" can be used as controller for a machine module or as stand-alone unit. In both operating modes, MOVIFIT® function level "Technology" can realize demanding drive tasks.

### 3.4 Application modules in MOVITOOLS® MotionStudio

#### 3.4.1 Engineering with MOVITOOLS® MotionStudio

Consistent engineering is possible with the MOVITOOLS® MotionStudio software package from SEW-EURODRIVE. This software offers all the tools necessary for automation and startup of drives:



9007200047617803

### 3.4.2 Application modules for a parameterizable unit

#### Description

In industry applications, a frequency inverter must not only perform speed control but also control complex motion sequences and take over typical tasks of the Programmable Logic Controller (PLC).

SEW-EURODRIVE offers various standardized control programs, so-called application modules, for "positioning" applications.

The application module has a user-friendly user interface to assist with parameterization. The user merely has to specify the parameters required for the application. The application module uses this information to create the control program and loads it into the frequency inverter.

MOVIFIT® function level "Technology" is in charge of the entire motion control. This means the application module takes load off the higher-level controller.

#### Advantages of application modules

Application modules offer you the following advantages:

- A wide range of functions
- User-friendly user interface
- Only required parameters must be entered
- Guided parameterization instead of complicated programming
- No programming experience required
- Quick training, therefore quick project planning and startup
- The entire motion control directly in the unit

#### Scope of delivery and documentation

The application modules are part of the MOVITOOLS® MotionStudio software package. They can be used with the following units: MOVIFIT® function level "Technology".

### INFORMATION



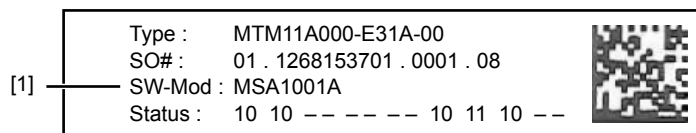
Information on how to operate the application modules is contained in separate manuals. They can be downloaded in PDF format from the homepage of SEW-EURODRIVE → [www.sew-eurodrive.com](http://www.sew-eurodrive.com).

### 3.4.3 Available application modules

The following application modules are available for MOVIFIT® function level "Technology".

- Transparent mode: Implemented on delivery as a standard.
- Cam positioning: Only for MOVIFIT® FC/MC.
- Bus positioning: Only for MOVIFIT® FC.

The EBOX nameplate shows the application module that was set at factory. The following figure shows an example:



9007200932270091

The following table shows the designations of the application modules [1] on the EBOX nameplate:

| SW-Mod   | Application module installed at factory |
|----------|-----------------------------------------|
| Empty    | Transparent mode                        |
| MSA1001A | Cam positioning                         |
| MSA1003A | Bus positioning                         |

### Transparent mode

The "Transparent mode" application module is used when the process output data from the higher-level controller (master) to the controller (MOVIFIT® function level "Technology") is to be forwarded to the lower-level units (integrated power section, external auxiliary axes, etc.) without being changed. The same applies to process data communication in the opposite direction.

The "Transparent mode" application module has the following features:

- Transmission of the process data received via fieldbus
  - from and to the digital inputs/outputs
  - from and to the integrated power section (only MOVIFIT® FC/SC)
  - from and to the connected MOVIMOT® inverter (only MOVIFIT® MC)
  - from and to the connected MOVIFIT® slaves
- Data backup for potential replacements
- Process data monitor as diagnostics and startup assistance for communication with the higher-level controller

## Cam positioning

The "Cam positioning" application module is used for cam and positioning applications.

Typical applications of the "Cam positioning" application module are:

- Roller and chain conveyors
- Lifting tables
- Rotary tables

The cam positioning application module has the following features:

- Bidirectional rapid/creep speed positioning to one limit switch at each end
- Runtime monitoring during positioning
- Monitoring of the creep speed when the stop limit switch is reached
- User-guided startup and diagnostics

The following operating modes are available as control method:

- Jog mode: The drive is controlled manually.
- Control via fieldbus or digital inputs

## Bus positioning

The "Bus positioning" application module is for all applications with a high number of target positions. The movement records are managed in the central controller for this application module. The target position and the travel velocity are determined via the fieldbus.

The bus positioning application module has the following features:

- Definition of any number of target positions and selection via fieldbus
- Free selection of travel speed for each positioning travel
- Definition and evaluation of software limit switch
- Evaluation of all HTL built-in encoders and add-on encoders with low resolution (max. 96 increments/revolution)

The following operating modes are available as control method:

- Jog mode: The drive is controlled manually.
- Reference travel: The drive is referenced to a reference switch or without enable.
- Automatic mode: The higher-level PLC controls the drive.

### 3.5 Free programming via MOVI-PLC®

SEW-EURODRIVE offers the freely programmable motion and logic controller MOVI-PLC® for solving complex machine automation tasks in a flexible manner.

Direct programming in the MOVI-PLC® development environment allows for turning application-specific requirements into drive applications. Tasks can be programmed using the standard IEC 61131 languages (LD, FBD, IL, ST, SFC). Furthermore, function blocks from different libraries can be combined into a program to ensure fast startup and implement complex motion sequences.

#### 3.5.1 Advantages of MOVI-PLC®

MOVI-PLC® offers you the following advantages:

- Simple handling
- Flexible programming of the application
- Standardized programming languages in accordance with IEC 61131-3
- PLCopen libraries for convenient automation
- On request: customized, application-specific programs
- Configuration, startup, monitoring, diagnostics and updates of all components from SEW-EURODRIVE
- Coordination of several axes
- Connection via fast, synchronous system bus
- All motion control tasks are concentrated in one MOVI-PLC®
- Relief of the central PLC
- Reduced response times
- Increased performance



### 3.5.2 Motion libraries for MOVIFIT® function level "Technology"

#### Description

MOVIFIT® function level "Technology" is equipped with a MOVI-PLC® controller.

The programming software PLC Editor is part of the MOVITOOLS® MotionStudio software package.

#### Functions

The libraries `MPLCMotion_MTF` and `MPLCMotion_MM` offer the following functions for the connected drive:

- Administrative functions
- Inverter operation (speed specification)
- Reference travel
- Positioning mode

#### Positioning applications

Positioning applications require encoders with suitable encoder signals. The encoder is connected directly to the integrated MOVI-PLC® controller. For information on the encoder connection, refer to the "MOVIFIT® FC" and "MOVIFIT® MC" operating instructions.

Observe the following notes when selecting the encoder:

- Permitted encoders: EI7. incremental encoder
- Encoder resolution: max. 96 increments/revolution
- Number of encoders: max. 3
- The encoder evaluation must be activated for each encoder.

The program modules required for positioning are included in the `MPLCMotion_MTF` library. The library is part of the MOVITOOLS® MotionStudio software package.

## 4 Startup



### ▲ WARNING

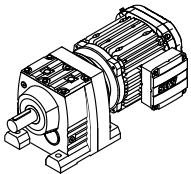
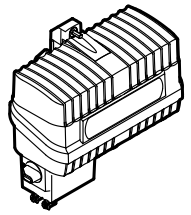
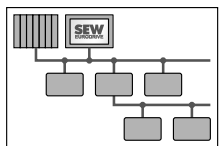
Danger due to improper safety shutdown in applications with safe disconnection.

Severe or fatal injuries.

- If you use a MOVIFIT® unit with the safety option S12, observe the permissible wiring diagrams as well as the safety conditions specified in the "MOVIFIT® MC/FC – Functional Safety with Safety Option S12" manual.

### 4.1 Startup procedure for MOVIFIT® FC and SC

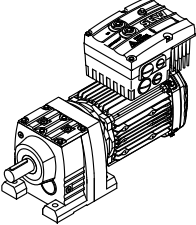
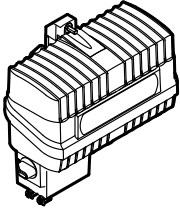
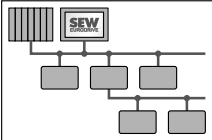
The following illustration gives an overview of the MOVIFIT® FC and SC startup procedure and lists other applicable documentation:

- |     |                                                                                     |                                                                                  |                                                                                                                                                                                                                                                                                                                                       |
|-----|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] |    | Motor startup                                                                    | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• The "DR..71 – 315, DRN80 – 315 AC Motors" operating instructions</li> </ul>                                                                                                                                                                              |
| [2] |   | MOVIFIT® unit startup                                                            | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• "MOVIFIT® FC" operating instructions</li> <li>• "MOVIFIT® SC" operating instructions</li> </ul>                                                                                                                                                          |
| [3] |  | Parameterization <sup>1)</sup><br>Programming with<br>MOVITOOLS®<br>MotionStudio | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• Chapter "Parameterization of the power section" (see (→ 158))</li> <li>• "MOVI-PLC® Programming in the PLC Editor" system manual</li> <li>• "Libraries MPLCMotion_MC07 and MPLCMotion_MM for MOVI-PLC®" manual</li> </ul>                                |
| [4] |  | Fieldbus configuration                                                           | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• Chapter "Configuration and startup" (see (→ 46) and (→ 93))</li> <li>• Chapter "Process data description in transparent mode" (see (→ 120))</li> <li>• Chapter "Error diagnostics for operation on EtherNet/IP™ and Modbus/TCP" (see (→ 118))</li> </ul> |

1) Parameters can only be set in "Expert mode".

## 4.2 Startup procedure for MOVIFIT® MC

The following illustration gives an overview of the MOVIFIT® MC startup procedure and lists other applicable documentation:

- |     |                                                                                     |                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                        |
|-----|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] |    | <p>MOVIMOT® in-<br/>verter startup</p>                                                              | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• "MOVIFIT® MC" operating instructions</li> <li>• "MOVIMOT® MM..D" operating instructions</li> </ul>                                                                                                                                                                                        |
| [2] |    | <p>MOVIFIT® unit<br/>startup</p>                                                                    | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• "MOVIFIT® MC" operating instructions</li> </ul>                                                                                                                                                                                                                                           |
| [3] |   | <p>Parameteriza-<br/>tion<sup>1)</sup><br/>Programming<br/>with<br/>MOVITOOLS®<br/>MotionStudio</p> | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• Chapter "Application modules in MOVITOOLS® MotionStudio"</li> <li>• Chapter "Configuration in transparent mode" (see (→ 208))</li> <li>• "MOVI-PLC® Programming in the PLC Editor" system manual</li> <li>• "Libraries MPLCMotion_MC07 and MPLCMotion_MM for MOVI-PLC®" manual</li> </ul> |
| [4] |  | <p>Fieldbus config-<br/>uration</p>                                                                 | <p>→ For information, refer to:</p> <ul style="list-style-type: none"> <li>• Chapter "Configuration and startup" (see (→ 46) and (→ 93))</li> <li>• Chapter "Process data description in transparent mode" (see (→ 120))</li> <li>• Chapter "Error diagnostics for operation on EtherNet/IP™ and Modbus/TCP" (see (→ 118))</li> </ul>                                  |

1) Parameters can only be set in "Expert mode".

## 4.3 Startup procedure with encoder

MOVIFIT® function level "Technology" supports positioning applications with EI7. incremental encoder.

### INFORMATION



For detailed information on how to program positioning applications, refer to the "MPLCMotion\_MC07 and MPLCMotion\_MM Libraries for MOVI-PLC®" manual.

## 5 Installation notes

### INFORMATION



For instructions on how to assemble and install MOVIFIT® units, refer to the "MOVIFIT® FC", "MOVIFIT® SC" or "MOVIFIT® MC" operating instructions.

This chapter contains information only on how to install Ethernet.

## 5.1 Industrial Ethernet networks

### 5.1.1 TCP/IP addressing and subnetworks

#### Description

The address of the TCP/IP protocol is set using the following parameters:

- MAC address
- IP address
- Subnet mask
- Standard gateway

The addressing mechanisms and subdivision of the TCP/IP networks into subnetworks are explained in this chapter to help you set the parameters correctly.

#### MAC address

The MAC (**M**edia **A**ccess **C**ontroller) address is the basis for all address settings. The MAC address is a worldwide unique 6-byte value (48 bits) assigned to the Ethernet device. The MAC address of Ethernet devices from SEW-EURODRIVE is 00-0F-69-xx-xx-xx.

The MAC address is difficult to handle for large networks. This is why freely assignable IP addresses are used.

#### IP address

The IP address is a 32-bit value that uniquely identifies a node in the network. An IP address is represented by 4 decimal numbers separated by decimal points.

Each decimal number stands for 1 byte (8 bits) of the address and can also be represented using binary code:

| Exemplary IP address: 192.168.10.4 |         |          |
|------------------------------------|---------|----------|
| Byte                               | Decimal | Binary   |
| 1                                  | 192     | 11000000 |
| 2                                  | 168     | 10101000 |
| 3                                  | 10      | 00001010 |
| 4                                  | 4       | 00000100 |

The IP address comprises a network address and a node address.

The part of the IP address that denotes the network and the part that identifies the node is determined by the network class and the subnet mask.

## Network class

The first byte of the IP address determines the network class and as such represents the division into network addresses and node addresses:

| Range of values<br>(Byte 1 of IP address) | Network class | Example: Complete network address | Meaning                                          |
|-------------------------------------------|---------------|-----------------------------------|--------------------------------------------------|
| 0 – 127                                   | A             | 10.1.22.3                         | 10 = Network address<br>1.22.3 = Node address    |
| 128 – 191                                 | B             | 172.16.52.4                       | 172.16 = Network address<br>52.4 = Node address  |
| 192 – 223                                 | C             | 192.168.10.4                      | 192.168.10 = Network address<br>4 = Node address |

Node addresses that consist only of zeros or ones are not permitted. The smallest address (all bits are zero) describes the network itself and the largest address (all bits are 1) is reserved for the broadcast.

This rough division is not sufficient for a number of networks. The networks also use an explicit, adjustable subnet mask.

## Subnetwork mask

A subnet mask is used to divide the network classes into even finer sections. Like the IP address, the subnet mask is represented by 4 decimal numbers separated by decimal points.

Each decimal number stands for 1 byte (8 bits) of the subnet mask and can also be represented using binary code:

| Exemplary subnet mask: 255.255.255.128 |         |          |
|----------------------------------------|---------|----------|
| Byte                                   | Decimal | Binary   |
| 1                                      | 255     | 11111111 |
| 2                                      | 255     | 11111111 |
| 3                                      | 255     | 11111111 |
| 4                                      | 128     | 10000000 |

The binary representation of the IP address and the subnet mask shows that in the subnet mask, all bits of the network address are set to 1 and only the bits of the node addresses have the value 0:

| IP address: 192.168.10.129 |             | Subnet mask: 255.255.255.128 |
|----------------------------|-------------|------------------------------|
|                            | Bytes 1 – 4 | Bytes 1 – 4                  |
| Network address            | 11000000    | 11111111                     |
|                            | 10101000    | 11111111                     |
|                            | 00001010    | 11111111                     |
| Node address               | 10000001    | 10000000                     |

The class C network with the network address 192.168.10 is further subdivided into the following 2 networks by the subnet mask 255.255.255.128:

| Network address | Node addresses                  |
|-----------------|---------------------------------|
| 192.168.10.0    | 192.168.10.1 – 192.168.10.126   |
| 192.168.10.128  | 192.168.10.129 – 192.168.10.254 |

The network nodes use a logical AND operation for the IP address and the subnet mask to determine whether there is a communication partner in the same network or in a different network. If the communication partner is in a different network, the standard gateway is addressed for passing on the data.

## Standard gateway

The standard gateway is also addressed via a 32-bit address. The 32-bit address is represented by 4 decimal numbers separated by decimal points.

**Exemplary standard gateway: 192.168.10.1**

The standard gateway establishes a connection to other networks. A network node that wants to address another node uses a logical AND operation of the IP address and subnet mask to determine whether the node is in the same network. If this is not the case, the network node addresses the standard gateway (router), which must be part of the actual network. The standard gateway then takes on the job of transmitting the data packages.

**DHCP (Dynamic Host Configuration Protocol)**

Instead of setting the 3 parameters IP address, subnet mask and standard gateway manually, they can be assigned automatically by a DHCP server in the Ethernet network.

The IP address is assigned based on a table in the DHCP server. The table contains an assignment of MAC addresses to IP addresses.

**5.1.2 Connection to the Ethernet network****The integrated Ethernet switch**

The unit is equipped with an integrated 2 port Ethernet switch for connecting the fieldbus technology. The following network topologies are supported:

- Tree topology
- Star topology
- Line topology
- Ring topology

**INFORMATION**

The number of industrial Ethernet switches connected in line impacts the telegram runtime. If a telegram passes through the units, the telegram runtime is delayed by the "store-and-forward" function of the Ethernet switch:

- For a telegram length of 64 bytes by approximately 10 µs (at 100 MBit/s)
  - For a telegram length of 1500 bytes by approximately 130 µs (at 100 MBit/s)
- This means the more units a telegram has to pass through, the higher the telegram runtime is.

*Auto-crossing*

The two ports leading out of the Ethernet switch have auto-crossing functionality. You can use both patch and crossover cables to connect to the next Ethernet node.

*Auto-negotiation*

The baud rate and duplex mode are negotiated by both Ethernet nodes when establishing the connection. For this purpose, both Ethernet ports of the EtherNet/IP™ connection support an auto-negotiation functionality and work with a baud rate of either 100 MBit or 10 MBit in full duplex or half-duplex mode.

### Notes on multicast handling

- The integrated Ethernet switch does not provide a filter function for Ethernet multicast telegrams. Multicast telegrams are sent from the adapters (device) to the scanners (PLC) and passed on to all switch ports.
- IGMP snooping (e.g. Managed Switches) is not supported.

## INFORMATION



SEW-EURODRIVE recommends to connect the device only with the following network components:

- That support IGMP snooping (e.g. Managed Switch).
- That have protection mechanisms against high Multicast load (e.g. units from SEW-EURODRIVE). Devices that do not have this function may be faulty due to high network load.

### Shielding and routing bus cables

## NOTICE

Risk of a compensating current flowing as a result of incorrect bus cable type, improper shielding and/or improperly routed bus cables.

Possible damage to property.

- In case of fluctuations in the ground potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding in accordance with relevant VDE regulations in such a case.

Only use shielded cables and connection elements that meet the requirements of category 5, class D according to IEC 11801 edition 2.0.

Correct shielding of the bus cable attenuates electrical interference that can occur in industrial environments. The following measures ensure the best possible shielding:

- Manually tighten the mounting screws on the connectors, modules, and equipotential bonding conductors.
- Use only connectors with a metal housing or a metalized housing.
- Connect the shielding in the connector over a wide surface area.
- Apply the shielding of the bus cable on both ends.
- Route signal and bus cables in separate cable ducts. Do not route them parallel to power cables (motor leads).
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding close to each other using the shortest possible route.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

## 5.2 Setting the IP address parameters

### 5.2.1 Initial startup

Depending on the DIP switch S11, the following IP address parameter settings are possible:

- The MOVIFIT® unit has fixed IP address parameters (DEF-IP) that cannot be changed.
- The MOVIFIT® unit awaits the IP address parameters being assigned by a DHCP server.
- The parameterized IP address parameters are valid.

### INFORMATION



There is a free DHCP server with the designation "BOOTP Utility" available on the Rockwell Automation homepage.

---

### 5.2.2 Changing the IP address parameters after successful initial startup

If the unit was started using a valid IP address, you can also access the IP address parameters via the Ethernet interface.

You can change the IP address parameters via the Ethernet interface by one of the following methods:

- Using the Engineering software MOVITOOLS® MotionStudio
- Using the TCP/IP interface object from EtherNet/IP™ (see chapter "TCP/IP interface object" (→ 87))
- Using the Address Editor from SEW-EURODRIVE (see chapter "Address Editor" (→ 149))
- Other interfaces of the MOVIFIT® unit

If the IP address parameters have been assigned to the unit via a DHCP server, you can only change the parameters by adjusting the settings of the DHCP server.

### INFORMATION



The following applies to all other types of changing the IP address parameters: The change only becomes effective if you switch the supply voltage (including DC 24 V) off and on again.

---



### 5.2.3 Deactivating/activating the DHCP

The type of IP address assignment is set with DIP switch S11/1 in the EBOX.

You can display and set the type of IP address assignment in the engineering software in the parameter tree of the unit in parameter *DHCP Startup Control*:

- "Stored IP parameters" setting  
The stored IP address parameters are used.
- "DHCP" setting  
The IP address parameters are requested by a DHCP server.

### 5.2.4 Address Editor from SEW-EURODRIVE

To access the IP settings of the fieldbus interface without matching Ethernet settings of PC and unit, use the Address Editor from SEW-EURODRIVE.

The Address Editor is installed together with the MOVITOOLS® MotionStudio software package but is used independently.

#### Advantages of the Address Editor

The IP settings of all devices from SEW-EURODRIVE can be made and displayed in the local subnetwork using Address Editor.

The Address Editor provides the following benefits:

- For the diagnostics and engineering software to access the device via Ethernet, the required settings for the PC are determined in the system during operation.
- During device startup, the IP settings are assigned to the fieldbus interface of the device without having to change the network connections or PC settings.

For further information, refer to the description of the MOVITOOLS® MotionStudio engineering software (see chapter "Address Editor" (→ 149)).

### 5.2.5 Setting the IP address parameter to the default value

You can use DIP switch "DEF IP" S11/2 to reset the IP address parameters to the default value.

The following IP address parameters are set:

- IP address: 192.168.10.4
- Subnet mask: 255.255.255.0
- Standard gateway: 1.0.0.0

### 5.2.6 Replacement procedure

All settings of IP address parameters and MAC addresses are stored in the ABOX memory. The settings therefore remain when the EBOX is changed.

The DIP switch "DEF IP" and "DHCP" (S11) of the new EBOX have to be set identically to the replaced EBOX.

### 5.3 Connection MOVIFIT® unit – Ethernet

The MOVIFIT® unit can be connected to the Ethernet via the following Ethernet interfaces in the ABOX:

- X30/X11 (RJ45 connector)
- X31/X12 (RJ45 connector)
- X11 (M12 connector)
- X12 (M12 connector)

To connect the unit to the Ethernet, connect one of the Ethernet interfaces to the other network node using a category 5, class D twisted-pair cable in accordance with IEC 11801, edition 2.0.

#### INFORMATION



According to IEC 802.3, the maximum cable length for 10/100 MBaud Ethernet (10BaseT/100BaseT) between 2 network nodes, is 100 m.

---

#### INFORMATION



In order to minimize the load on the end units resulting from unintended multi-cast data transmission in Ethernet networks, SEW-EURODRIVE recommends not to connect any third-party end devices directly to units from SEW-EURODRIVE.

- Connect third-party end devices via a network component that supports the IGMP snooping functionality (e.g. managed switch).
- Managed switches with IGMP snooping functionality are not required for Modbus/TCP and PROFINET IO networks.
-

### 5.3.1 X30/X11, X31/X12: Ethernet interface

The following table shows information about this connection:

| Function                                                                                               |      |                   |
|--------------------------------------------------------------------------------------------------------|------|-------------------|
| <ul style="list-style-type: none"> <li>EtherNet/IP™ interface</li> <li>Modbus/TCP interface</li> </ul> |      |                   |
| Connection type                                                                                        |      |                   |
| Push-pull RJ45                                                                                         |      |                   |
| Wiring diagram                                                                                         |      |                   |
|                      |      |                   |
| Assignment                                                                                             |      |                   |
| No.                                                                                                    | Name | Function          |
| 1                                                                                                      | TX+  | Transmit line (+) |
| 2                                                                                                      | TX-  | Transmit line (-) |
| 3                                                                                                      | RX+  | Receive line (+)  |
| 4                                                                                                      | Res. | Reserved          |
| 5                                                                                                      | Res. | Reserved          |
| 6                                                                                                      | RX-  | Receive line (-)  |
| 7                                                                                                      | Res. | Reserved          |
| 8                                                                                                      | Res. | Reserved          |

#### Connection cable

#### NOTICE

The RJ45 socket can be damaged when inserting commercially available RJ45 patch cables without push-pull connector housing.

Damage to the RJ45 socket.

- Only plug suitable push-pull RJ45 mating connectors according to IEC 61076-3-117 into push-pull RJ45 sockets.
- Never use commercially available RJ45 patch cables without push-pull connector housing. These plug connectors do not snap in place when they are plugged.

Use only shielded cables for this connection.

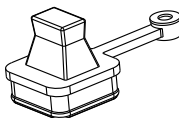
## Closing plug, optional

**NOTICE**

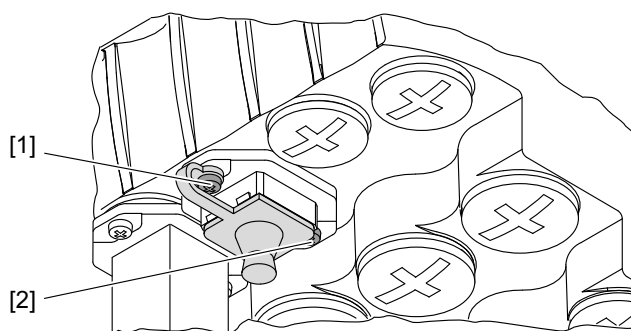
Loss of warranted degree of protection if the closing plugs are installed incorrectly or not at all.

Damage to the MOVIFIT® unit.

- If an RJ45 socket is not occupied by a connector, you must seal it with the following closing plug.

| Type                                                      | Figure                                                                             | Content   | Part number |
|-----------------------------------------------------------|------------------------------------------------------------------------------------|-----------|-------------|
| <b>Ethernet closing plug</b><br>for Push pull RJ45 socket |  | 10 pieces | 18223702    |
|                                                           |                                                                                    | 30 pieces | 18223710    |

To avoid losing the closing plug, you can secure it with the front retaining screw [1] of the socket, see following figure.

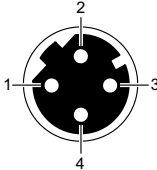


9007202932076683

Do **not** use the back screw [2] to secure the closing plug.

### 5.3.2 X11, X12: Ethernet interface

The following table shows information about this connection:

| Function                                                                                               |      |                   |
|--------------------------------------------------------------------------------------------------------|------|-------------------|
| <ul style="list-style-type: none"> <li>EtherNet/IP™ interface</li> <li>Modbus/TCP interface</li> </ul> |      |                   |
| Connection type                                                                                        |      |                   |
| M12, 4-pin, female, D-coded                                                                            |      |                   |
| Wiring diagram                                                                                         |      |                   |
|                      |      |                   |
| Assignment                                                                                             |      |                   |
| No.                                                                                                    | Name | Function          |
| 1                                                                                                      | TX+  | Transmit line (+) |
| 2                                                                                                      | RX+  | Receive line (+)  |
| 3                                                                                                      | TX-  | Transmit line (-) |
| 4                                                                                                      | RX-  | Receive line (-)  |

### 5.3.3 External SBus connection to MOVIFIT® slaves

#### INFORMATION



A maximum of 6 SBus slaves can be connected to an SBus master.

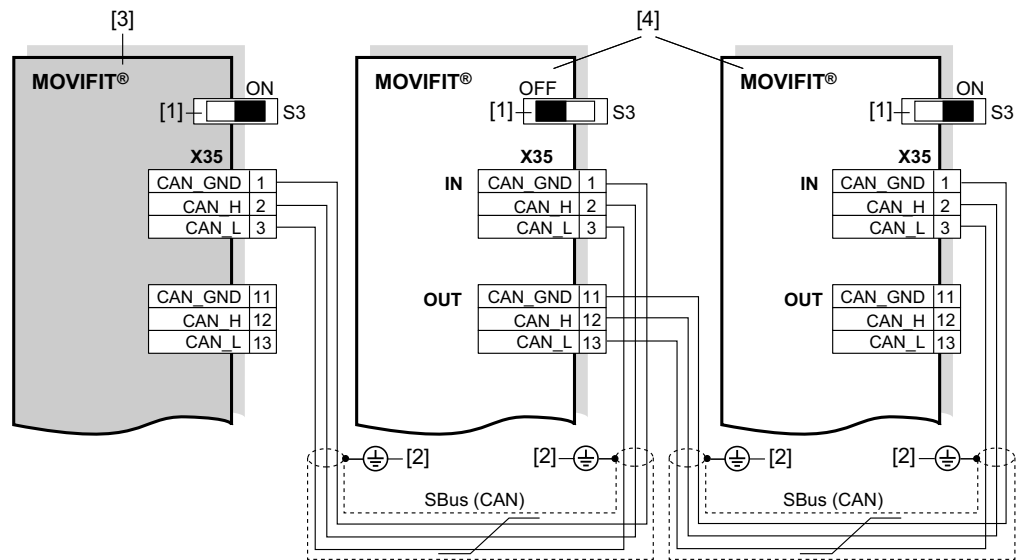
#### INFORMATION



There must not be any potential shift between the units connected via the SBus.

- To avoid a potential shift, connect the unit grounds with separate cables.

The following figure shows the system bus connection.



9007201040805131

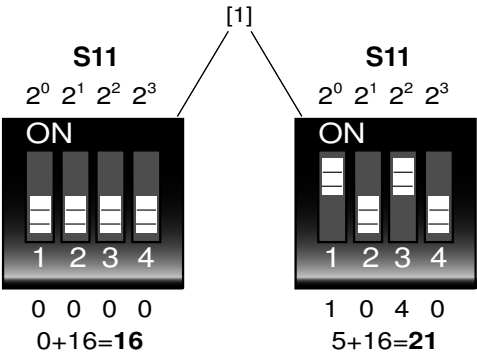
- [1] DIP switch S3 for bus connection      [2] EMC cable gland  
[3] SBus master      [4] SBus slave 1 – 6

Please note:

- If the MOVIFIT® unit is located at the end of an SBus segment, it is only connected via the incoming SBus cable (CAN).
- To prevent malfunctions in the bus system due to reflections, etc., the SBus segment must be terminated at the first and last physical stations with bus terminating resistors.
- The bus terminating resistors are already installed in the MOVIFIT® ABOX and they can be activated using the S3 DIP switch.
- If possible, use a 2x2 core twisted and shielded copper cable (data transmission cable with braided copper shield). Connect the shield of the cable to the metal housing of the MOVIFIT® ABOX using an EMC cable gland. Additionally for a 2-core cable, connect the shield ends to the ground (GND). The cable must meet the following specifications:
  - Core cross section 0.25 mm<sup>2</sup> (AWG23) – 0.75 mm<sup>2</sup> (AWG18)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz
 Suitable cables are e.g. CAN bus or DeviceNet™ cables.
- The permitted total cable length is 100 m at a fixed SBus baud rate of 500 kBaud.
- Point-to-point wiring is not permitted.

Setting SBus slave addresses

The SBus slave addresses are set in the respective EBOX of the MOVIFIT® slaves with the DIP switches S11/1 – S11/4. The SBus slave addresses are a combination of the DIP switch S11 settings and a fixed offset of 16.



14281754763

[1] SBus slave 1 – 6

Set the SBus slave addresses in ascending order starting with 16 for the first SBus slave node.

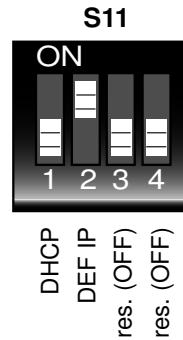
## 5.3.4 Setting the DIP switches in the EBOX

## INFORMATION



Before changing a DIP switch setting, disconnect the MOVIFIT® unit from power (supply voltage and 24 V backup operation). The DIP switch settings are only adopted during initialization.

You can set the IP address parameters at the DIP switches S11/1 – S11/2.



9007200422438795

| S11/1<br>"DHCP" | S11/2<br>"DEF IP" | Behavior                                                                                                                                                                                                                                                                                                |
|-----------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON              | ON                | This combination of settings is not permitted.                                                                                                                                                                                                                                                          |
| ON              | OFF               | The MOVIFIT® awaits the IP address parameters being assigned by a DHCP server.                                                                                                                                                                                                                          |
| OFF             | ON                | The IP address parameters are set to the following default values when the DC 24 V voltage is switched on:<br>IP address: 192.168.10.4<br>Subnet mask: 255.255.255.0<br>Standard gateway: 1.0.0.0 with EtherNet/IP™<br>DHCP / Startup Configuration: Stored IP address parameters (DHCP is deactivated) |
| OFF             | OFF               | The IP address parameters set in the parameter tree are used. On delivery, the above-mentioned default values are set.                                                                                                                                                                                  |

On delivery, both DIP switches S11/1 and S11/2 are set to "OFF".

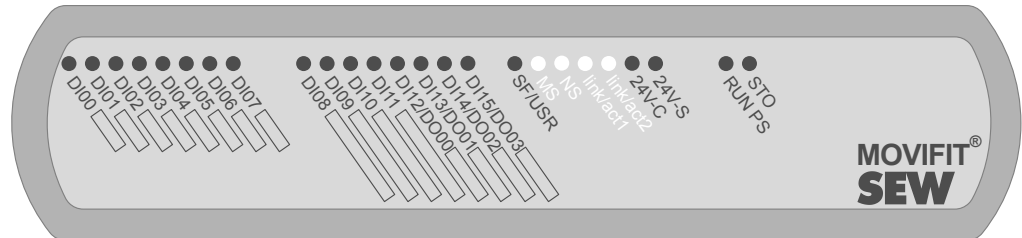


### 5.3.5 Status LEDs

#### General LEDs

The following figure shows an example of the LEDs for MOVIFIT® function level "Technology" with EtherNet/IP™ or Modbus/TCP interface.

This chapter describes the fieldbus-independent and option-independent LEDs. These LEDs are shown as dark in the figure.



14283096971

#### "DI.." LEDs

The following table shows the statuses of the "DI00 – DI15" LEDs:

| LED                          | Meaning                                         |
|------------------------------|-------------------------------------------------|
| <b>Yellow</b><br>Illuminated | Input signal present at digital input DI..      |
| <b>Off</b>                   | Input signal at digital input DI.. open or "0". |

#### "DO.." LEDs

The following table shows the statuses of the "DO00 – DO03" LEDs.

| LED                          | Meaning                  |
|------------------------------|--------------------------|
| <b>Yellow</b><br>Illuminated | DO.. output switched.    |
| <b>Off</b>                   | DO.. output logical "0". |

#### "24V-C" LED

The following table shows the states of the "24V-C" LED:

| LED                         | Meaning                                  | Measure                         |
|-----------------------------|------------------------------------------|---------------------------------|
| <b>Green</b><br>Illuminated | 24V_C continuous voltage is present.     | -                               |
| <b>Off</b>                  | 24V_C continuous voltage is not present. | Check the 24V_C voltage supply. |

## LED "24V-S"

The following table shows the states of the "24V-S" LED:

| LED                         | Meaning                                | Measure                         |
|-----------------------------|----------------------------------------|---------------------------------|
| <b>Green</b><br>Illuminated | 24V_S actuator voltage is present.     | -                               |
| <b>Off</b>                  | 24V_S actuator voltage is not present. | Check the 24V_S voltage supply. |

## "SF/USR" LED

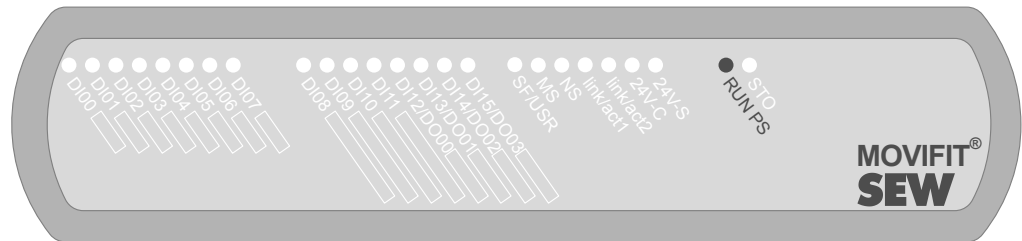
The following tables show the states of the "SF/USR" LED:

| LED                                    | Meaning                                                                        | Measure                                                                                                                        |
|----------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Off</b>                             | IEC program is running.                                                        | -                                                                                                                              |
| <b>Green</b><br>Lights up              | IEC program is running.<br>The green lit LED is controlled by the IEC program. | Refer to the IEC program documentation for more information.                                                                   |
| <b>Red</b><br>Lights up                | Boot project has not been started or has been cancelled due to an error.       | Use MOVITOOLS® MotionStudio > PLC Editor > Remote Tool to log on; start the boot project.                                      |
|                                        | MOVIFIT® initialization fault<br>Incorrect EBOX-ABOX combination               | Incorrect card ID.<br>Check the MOVIFIT® EBOX type. Use the correct EBOX on the ABOX and perform a complete startup procedure. |
| <b>Red</b><br>Flashing                 | No IEC program loaded.                                                         | Load an IEC program and, if necessary, restart the integrated PLC.                                                             |
| <b>Yellow</b><br>Flashing              | The IEC program has been loaded but is not executed (PLC = stop).              | Check the IEC program using MOVITOOLS® MotionStudio and restart the integrated PLC.                                            |
| <b>1 x red + n x green</b><br>Flashing | Fault status reported by the IEC program.                                      | Refer to the IEC program documentation for more information on the statuses and the corresponding remedy.                      |

## LED "RUN PS"

The "RUN PS" LED indicates the operating state of the motor starter (with MOVIFIT® SC) or of the integrated frequency inverter (with MOVIFIT® FC). MOVIFIT® MC has no "RUN PS" LED.

The following figure shows the "RUN PS" LED (shown unlit).



14284418315

### "RUN PS" LED (frequency inverter status LED)

The following table shows the statuses of the "RUN PS" LED at MOVIFIT® FC.

| LED                                    | Meaning<br>Operating state<br>error code      | Possible cause                                                                      |
|----------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Off</b>                             | Not ready                                     | No 24 V power supply.                                                               |
| <b>Yellow</b><br>Flashing              | Not ready                                     | Self-test phase active or 24 V power supply present but line voltage not OK.        |
| <b>Yellow</b><br>Flashing quickly      | Ready for operation                           | Brake release without drive enable active.                                          |
| <b>Yellow</b><br>Lights up             | Ready but unit inhibited                      | 24 V supply and line voltage OK, but no enable signal.                              |
| <b>Yellow</b><br>Flashing twice, pause | Ready, but in manual mode without unit enable | 24 V power supply and line voltage OK. Stop manual mode to activate automatic mode. |
| <b>Green/yellow</b><br>Flashing        | Ready for operation, but timeout              | Communication interrupted during cyclical data exchange.                            |
| <b>Green</b><br>Lights up              | Unit enabled                                  | Motor in operation.                                                                 |
| <b>Green</b><br>Flashing quickly       | Current limit active                          | Drive at current limit.                                                             |
| <b>Green</b><br>Flashing               | Ready for operation                           | Standstill current function active.                                                 |

| LED                               | Meaning<br>Operating state<br>error code | Possible cause                                                                                                       |
|-----------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Red<br>Lights up                  | Not ready                                | Check 24 V supply. Make sure that there is a smoothed DC voltage with low ripple (residual ripple max. 13%) present. |
|                                   |                                          | MOVIFIT® unit detected a non-plausible combination of DIP switch settings. Check 24V_C supply.                       |
| Red<br>Flashing twice,<br>pause   | Fault 07                                 | DC link voltage too high.                                                                                            |
| Red<br>Flashing slowly            | Fault 08                                 | Speed monitoring error                                                                                               |
|                                   | Fault 09                                 | Incorrect startup/parameterization                                                                                   |
|                                   | Fault 15                                 | 24 V supply voltage too low.                                                                                         |
|                                   | Faults 17 – 24, 37                       | CPU error                                                                                                            |
|                                   | Fault 25                                 | EEPROM error                                                                                                         |
|                                   | Fault 26                                 | Fault at external terminal (only at slave unit)                                                                      |
|                                   | Fault 38, 45                             | Unit/motor data error                                                                                                |
|                                   | Fault 90                                 | Incorrect motor/frequency inverter assignment. Invalid DIP switch setting.                                           |
|                                   | Fault 94                                 | Checksum error                                                                                                       |
| Red<br>Flashing 3 times,<br>pause | Fault 97                                 | Copy error                                                                                                           |
|                                   | Fault 01                                 | Overcurrent in output stage                                                                                          |
| Red<br>Flashing 4 times,<br>pause | Fault 11                                 | Overtemperature in output stage                                                                                      |
|                                   | Fault 31                                 | Temperature sensor tripped.                                                                                          |
| Red<br>Flashing 5 times,<br>pause | Fault 84                                 | Motor overload                                                                                                       |
|                                   | Fault 4                                  | Overcurrent in brake chopper                                                                                         |
| Red<br>Flashing 6 times,<br>pause | Fault 89                                 | Brake overtemperature<br>Incorrect motor/frequency inverter assignment.                                              |
|                                   | Fault 06                                 | Line phase failure                                                                                                   |
|                                   | Fault 81                                 | Start condition (only in hoist operation mode)                                                                       |
|                                   | Fault 82                                 | Open output                                                                                                          |

"RUN PS" LED (motor starter status LED)

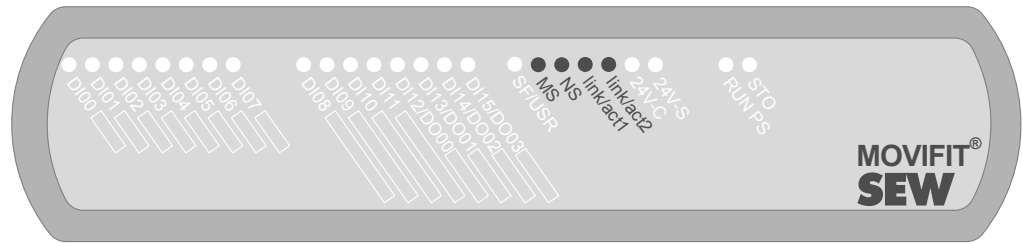
The following table shows the statuses of the "RUN PS" LED at MOVIFIT® SC.

| LED                                    | Meaning<br>Operating state<br>error code      | Possible cause                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Off</b>                             | Not ready                                     | No 24 V power supply.                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Yellow</b><br>Flashing              | Not ready                                     | Self-test phase active or 24 V power supply present but line voltage not OK.                                                                                                                                                                                                                                                                                                                                        |
| <b>Yellow</b><br>Flashing quickly      | Ready for operation                           | Operating state "Release brake of drive 1 and/or drive 2 without drive enable"                                                                                                                                                                                                                                                                                                                                      |
| <b>Yellow</b><br>Lights up             | Ready but unit inhibited                      | Normal operation "No enable": <ul style="list-style-type: none"> <li>Motor starter ready for operation (24 V supply and line voltage present)</li> <li>Motor starter power section not enabled</li> </ul>                                                                                                                                                                                                           |
| <b>Yellow</b><br>Flashing twice, pause | Ready, but in manual mode without unit enable | 24 V supply and line voltage OK. Stop manual mode to activate automatic mode.                                                                                                                                                                                                                                                                                                                                       |
| <b>Green/<br/>yellow</b><br>Flashing   | Ready for operation, but timeout              | Communication interrupted during cyclical data exchange.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Green</b><br>Lights up              | Unit enabled                                  | Normal operation "enable" for single-motor operation: <ul style="list-style-type: none"> <li>Motor starter ready for operation (24 V supply and line voltage present)</li> <li>Motor enabled</li> </ul> Normal operation "enable" for dual-motor operation: <ul style="list-style-type: none"> <li>Motor starter ready for operation (24 V supply and line voltage present)</li> <li>Both drives enabled</li> </ul> |
| <b>Green</b><br>Flashing once, pause   | Unit enabled                                  | Normal operation "enable" for dual-motor operation: <ul style="list-style-type: none"> <li>Motor starter ready for operation (24 V supply and line voltage present)</li> <li>Drive 1 enabled</li> </ul>                                                                                                                                                                                                             |
| <b>Green</b><br>Flashing twice, pause  | Unit enabled                                  | Normal operation "enable" for dual-motor operation: <ul style="list-style-type: none"> <li>Motor starter ready for operation (24 V supply and line voltage present)</li> <li>Drive 2 enabled</li> </ul>                                                                                                                                                                                                             |
| <b>Red</b><br>Lights up                | Not ready                                     | 24V_C and 24V_P supply OK. Motor starter power section board defective                                                                                                                                                                                                                                                                                                                                              |

| LED                                   | Meaning<br>Operating state<br>error code | Possible cause                                                                                                                                                                           |
|---------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Red</b><br>Flashing slowly         | Fault 09                                 | <ul style="list-style-type: none"> <li>Startup error "Faulty line connection sequence"</li> <li>Startup error "Minimum current monitoring drive 2 for single-motor operation"</li> </ul> |
|                                       | Faults 17 – 23, 37                       | CPU error                                                                                                                                                                                |
|                                       | Fault 25                                 | EEPROM error                                                                                                                                                                             |
|                                       | Fault 26                                 | External terminal error                                                                                                                                                                  |
|                                       | Fault 44                                 | Ixt utilization, total current drives 1 and 2                                                                                                                                            |
|                                       | Fault 45                                 | System initialization                                                                                                                                                                    |
|                                       | Fault 94                                 | Check sum error performance parameters                                                                                                                                                   |
| <b>Red</b><br>Flashing 3 times, pause | Fault 01                                 | Overcurrent motor/output stage                                                                                                                                                           |
|                                       | Fault 11                                 | Overtemperature in output stage                                                                                                                                                          |
| <b>Red</b><br>Flashing 4 times, pause | Fault 31                                 | Temperature sensor tripped.                                                                                                                                                              |
|                                       | Fault 84                                 | Motor overload                                                                                                                                                                           |
| <b>Red</b><br>Flashing 5 times, pause | Fault 89                                 | Brake overtemperature<br>Brake of drive 1/2 thermally overloaded.                                                                                                                        |
| <b>Red</b><br>Flashing 6 times, pause | Fault 06                                 | Line phase failure                                                                                                                                                                       |
|                                       | Fault 82                                 | Output open drive 1/2.                                                                                                                                                                   |

## Bus-specific LEDs for EtherNet/IP™ and Modbus/TCP

This chapter describes the bus-specific LEDs for EtherNet/IP™ and Modbus/TCP. These LEDs are shown as dark in the following figure.



14283737611

### LEDs "MS" and "NS"

The following table lists the statuses of the "MS" (Module Status) and "NS" (Network Status) LEDs:

| LED                                    |                                        | Meaning                                                                                                       | Measure                                                                                                                                                                                                                                                                      |
|----------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MS</b><br>Off                       | <b>NS</b><br>Off                       | MOVIFIT® unit is not ready for operation.<br>No DC 24 V supply.                                               | <ul style="list-style-type: none"> <li>Check DC 24 V supply.</li> <li>Switch MOVIFIT® on again.</li> <li>Replace EBOX if problem occurs several times.</li> </ul>                                                                                                            |
| <b>MS</b><br>Red/<br>green<br>Flashing | <b>NS</b><br>Red/<br>green<br>Flashing | MOVIFIT® unit performs an LED test.<br>This status should only be activated briefly during start-up.          | -                                                                                                                                                                                                                                                                            |
| <b>MS</b><br>Red<br>Flashing           | <b>NS</b><br>Red<br>Lights up          | Conflict detected while assigning the IP address.<br>Another station in the network uses the same IP address. | <ul style="list-style-type: none"> <li>Check whether there is a unit in the network with the same IP address.</li> <li>Change the MOVIFIT® IP address.</li> <li>Check DHCP settings for IP address assignment of the DHCP server (only if a DHCP server is used).</li> </ul> |
| <b>MS</b><br>Red<br>Lights up          | <b>NS</b><br>X                         | Fault in MOVIFIT® components hardware.                                                                        | <ul style="list-style-type: none"> <li>Switch MOVIFIT® on again.</li> <li>Reset MOVIFIT® to the factory settings.</li> <li>Replace EBOX if problem occurs several times.</li> </ul>                                                                                          |
| <b>MS</b><br>Green<br>Flashing         | <b>NS</b><br>Green<br>Flashing         | Application has been started.                                                                                 | -                                                                                                                                                                                                                                                                            |

| LED                             |                                 | Meaning                                                                                                                                                                                              | Measure                                                                                                                                                                                             |
|---------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MS</b><br>Green<br>Flashing  | <b>NS</b><br>Off                | MOVIFIT® does not have any IP parameters yet.<br>Starting TCP IP stack.<br>If the status continues and the DHCP DIP switch is activated, the MOVIFIT® unit is waiting for data from the DCHP server. | <ul style="list-style-type: none"> <li>Set DIP switch S11/1 of the DHCP server to "OFF".</li> <li>Check the DHCP server connection (only if DHCP is activated and the status continues).</li> </ul> |
| <b>MS</b><br>Green<br>Lights up | <b>NS</b><br>X                  | MOVIFIT® component hardware OK.                                                                                                                                                                      | -                                                                                                                                                                                                   |
| <b>MS</b><br>X                  | <b>NS</b><br>Red<br>Flashing    | Timeout interval of the controlling connection has expired.<br>The state is reset by restarting communication.                                                                                       | <ul style="list-style-type: none"> <li>Check the bus connection of the MOVIFIT® unit.</li> <li>Check the master/scanner.</li> <li>Check all the cables in the Ethernet.</li> </ul>                  |
| <b>MS</b><br>X                  | <b>NS</b><br>Green<br>Flashing  | No controlling connection.                                                                                                                                                                           | -                                                                                                                                                                                                   |
| <b>MS</b><br>X                  | <b>NS</b><br>Green<br>Lights up | There is no controlling connection to a master/scanner.                                                                                                                                              | -                                                                                                                                                                                                   |

X Any state

#### "link/act 1" LED

The "link/act 1" LED indicates the states of Ethernet port 1 according to the following table:

| LED                          | Meaning                                                             |
|------------------------------|---------------------------------------------------------------------|
| <b>Green</b><br>Illuminated  | link = Ethernet cable connects device with other Ethernet stations. |
| <b>Yellow</b><br>Illuminated | act = active, Ethernet communication active.                        |

#### "link/act 2" LED

The "link/act 2" LED indicates the states of Ethernet port 2 according to the following table:

| LED                         | Meaning                                                             |
|-----------------------------|---------------------------------------------------------------------|
| <b>Green</b><br>Illuminated | link = Ethernet cable connects device with other Ethernet stations. |



| LED                          | Meaning                                      |
|------------------------------|----------------------------------------------|
| <b>Yellow</b><br>Illuminated | act = active, Ethernet communication active. |

## 6 Configuration and startup of EtherNet/IP™

This chapter provides information on the configuration of the EtherNet/IP™ master (scanner) and startup of the MOVIFIT® function level "Technology" for fieldbus operation.

Requirements for correct configuration and startup are:

- Correct connection
- Correct setting of the IP address parameters of the MOVIFIT® unit (see chapter "Installation notes" (→ 24))

Configuration is explained with examples. The examples are configurations carried out with the programming software RSLogix 5000 by Rockwell Automation.

### 6.1 Device description file for EtherNet/IP™ (EDS file)

#### NOTICE

Damage to the unit due to malfunction due to a modified EDS file.

Damages to the unit.

- Do **not** change or expand entries in the EDS file. SEW-EURODRIVE assumes no liability for malfunctions of the unit caused by a modified EDS file.

For proper operation of the MOVIFIT® function level "Technology" with EtherNet/IP™ interface, the following device description file (EDS file) is required:

- SEW\_MOVIFIT\_TECH\_ENIP.eds

#### INFORMATION



The latest version of the EDS file for MOVIFIT® function level "Technology" can be downloaded from the SEW-EURODRIVE homepage → [www.sew-eurodrive.com](http://www.sew-eurodrive.com).

### 6.2 Configuration of the EtherNet/IP™ master

The configuration procedure depends on the version of the programming software RSLogix.

- For RSLogix versions up to version V19, the EDS file cannot be used directly. In this case, use the general device GenericDevice and set the communication properties manually.
- For RSLogix versions higher than version V20, the EDS file can be used directly.

### 6.2.1 Configuration with RSLogix 5000 up to version V19

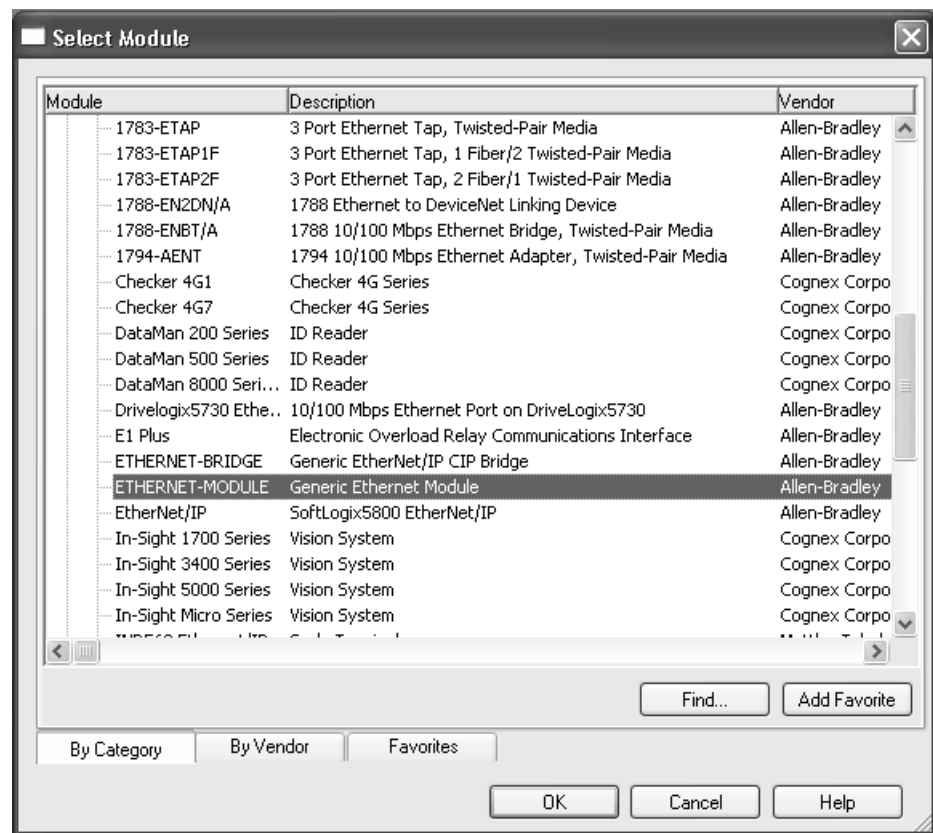
The following example describes configuration of the Allen Bradley control ControlLogix 1756\_L61 with RSLogix 5000 Version V19.

For the Ethernet communication, a 1756-EN2TR EtherNet/IP™ interface is used.

Proceed as follows:

1. Start RSLogix 5000 and select the view "Controller Organizer" (tree structure on left part of the window).
2. Select the EtherNet/IP™ interface (1756-EN2TR in this case) in the folder "I/O configuration".
3. Select the command [New Module] from the context menu.

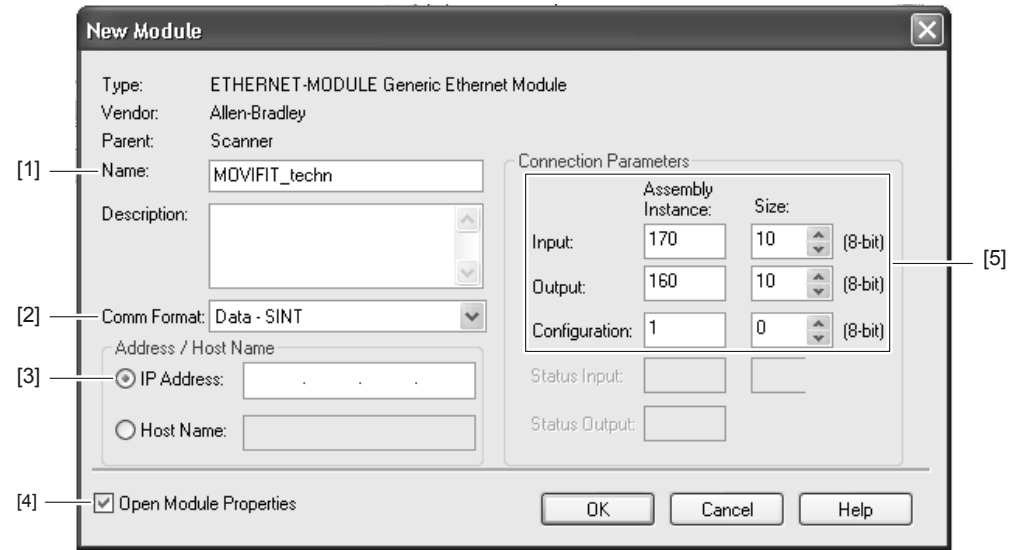
⇒ A module catalog is displayed.



15107870731

4. Select "ETHERNET MODULE" in the "Communication" category.

- Click [OK].  
⇒ The following window is displayed.



15115585547

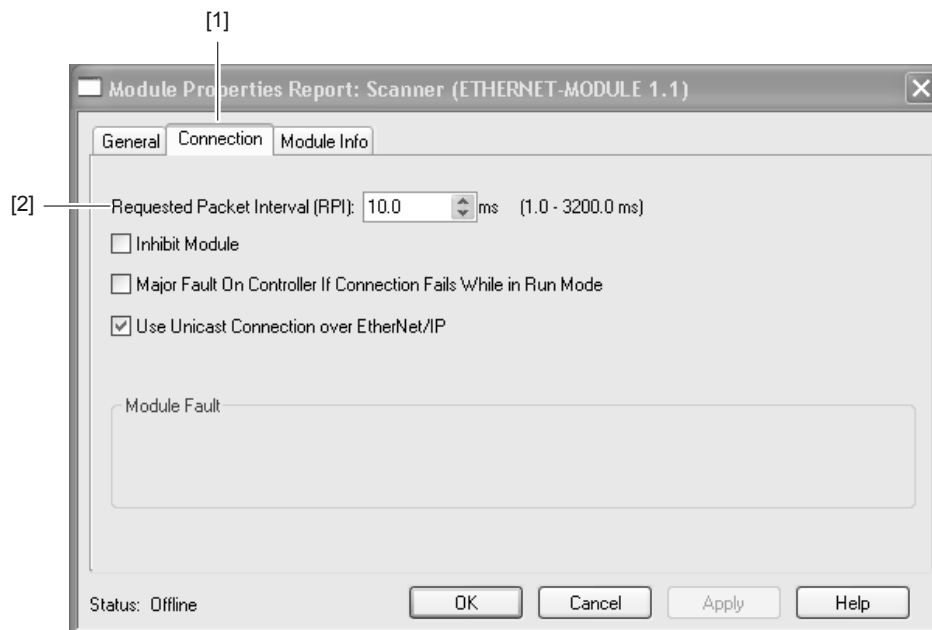
- In the edit box [1], enter the name of the EtherNet/IP™ interface with which the data are stored in the controller tags.
- Enter the IP address of the EtherNet/IP™ interface field in the edit box [3].
- Select either data format "Data-INT" or "Data-SINT" from the drop-down list [2].  
⇒ The process data always contain 16 bits (INT). The maximum number of process data is 32 (for "Comm format" DATA-INT) or 64 (for "Comm format" DATA-SINT).
- Enter the following connection parameters in the section [5]:

| Window element                  | Value |
|---------------------------------|-------|
| Input Assembly Instance         | 170   |
| Output Assembly Instance        | 160   |
| Configuration Assembly Instance | 1     |
| Input Size                      | 10    |
| Output Size                     | 10    |
| Configuration Size              | 0     |

- Activate the check box [4].

11. Click [OK].

⇒ The following window is displayed.



15115056395

12. Open the tab [1].

13. Enter a cycle time (data rate) in the edit box [2]. The unit supports a cycle time of a minimum of 5 ms. Longer cycle times can be implemented without any problems.

14. Click [OK].

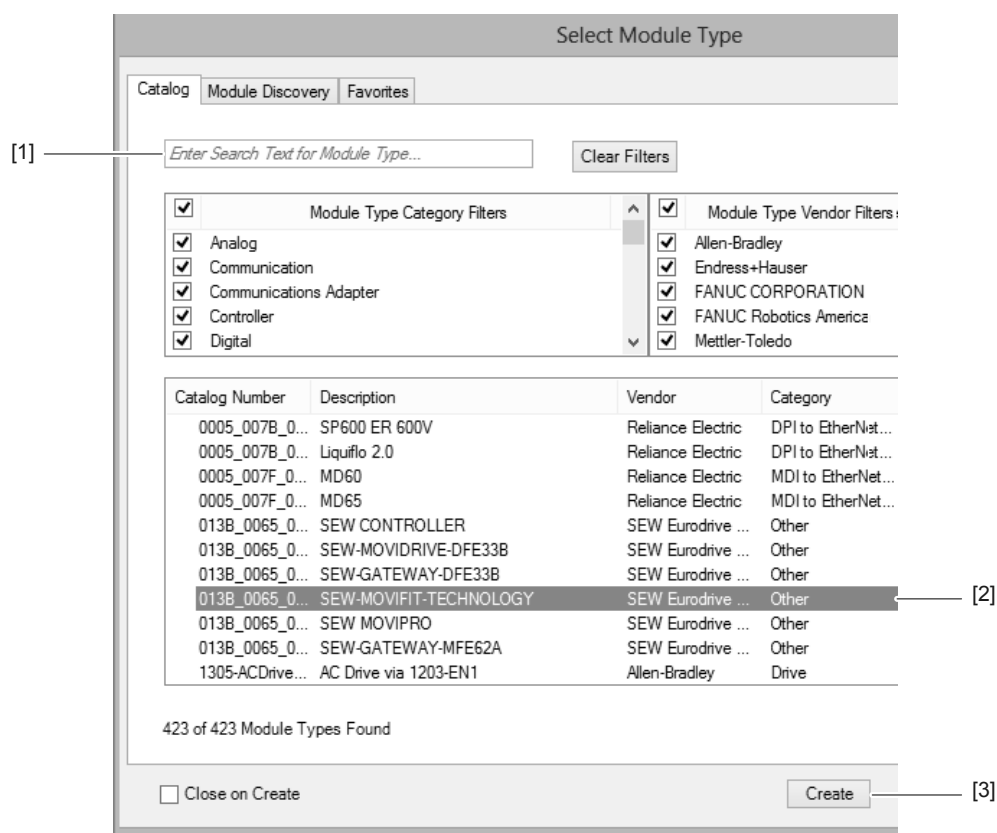
⇒ The device is included in the project and the settings are adopted.

### 6.2.2 Configuration with RSLogix 5000 as of version V20

The following example describes configuration of the Allen Bradley controller Control-Logix 1756\_L71 with Studio 5000 Logix Designer, version V24 (up to Version V20: RSLogix 5000). An 1756-EN2TR EtherNet/IP™ interface is used for Ethernet communication.

Proceed as follows:

1. Start Studio 5000 Logix Designer and select the view "Controller Organizer" (tree structure on left part of the window).
  2. Select the EtherNet/IP™ interface (1756-EN2TR in this case) in the folder "I/O configuration".
  3. Select the command [New Module] from the context menu.
- ⇒ A module catalog is displayed.

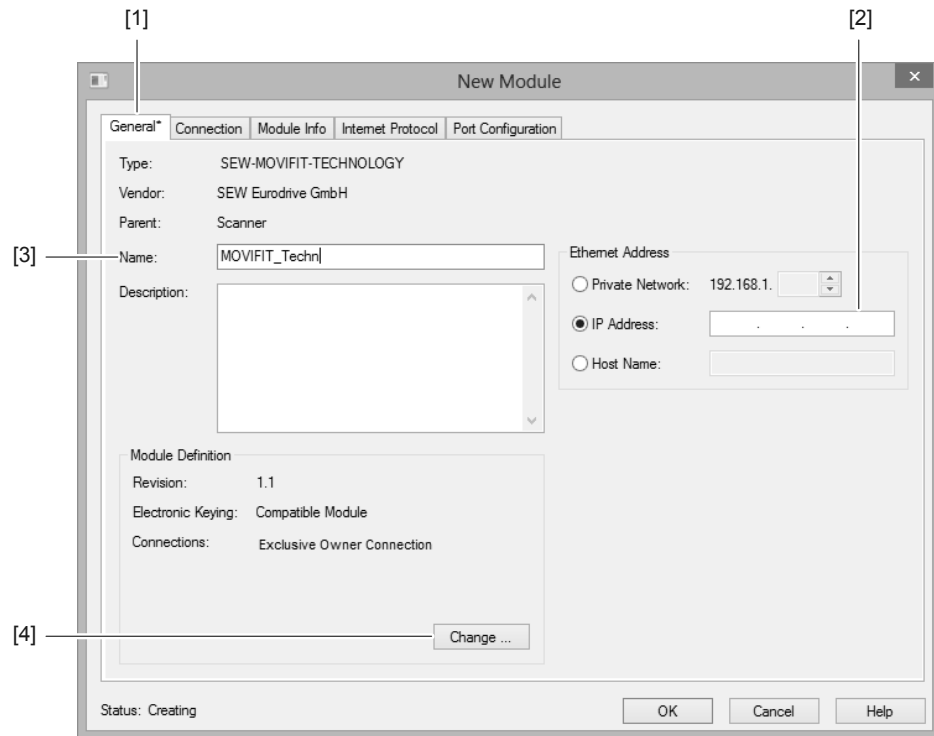


15117187979

4. Enter "Movifit" in the search field [1] and press the <Enter> key.
 

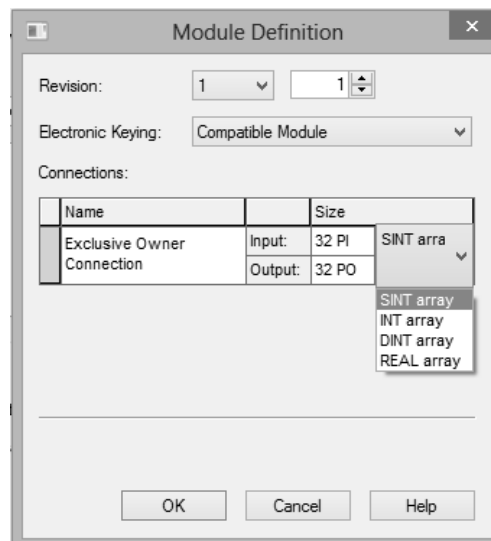
⇒ If the EDS file was installed correctly, the MOVIFIT® unit is displayed in the catalog.
5. Select "SEW MOVIFIT-TECHNOLOGY" [2].

6. Click the [Create] button [3].  
⇒ The following window is displayed.



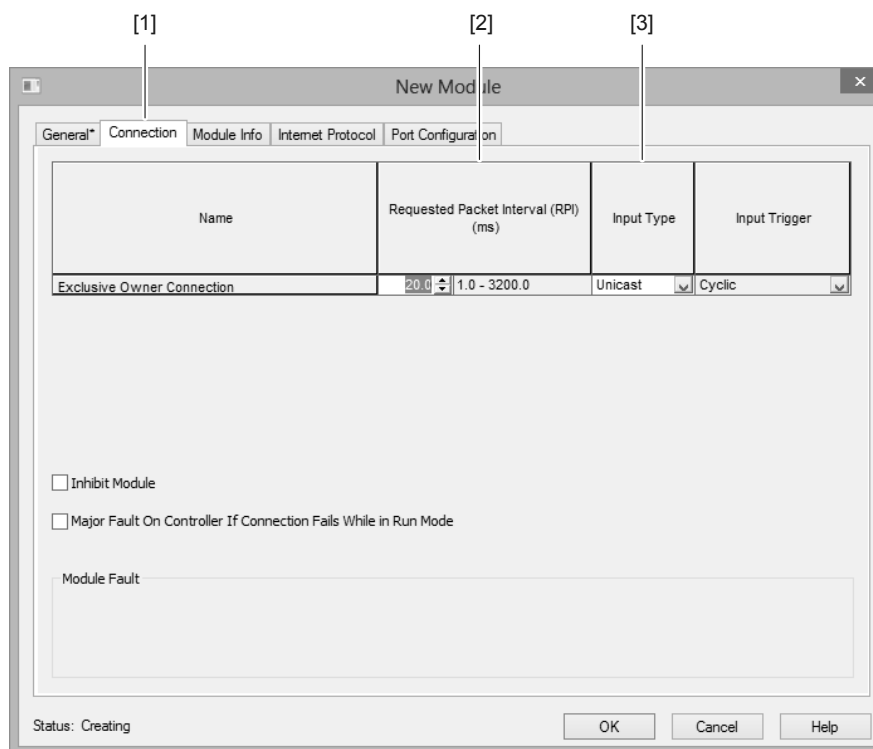
15117191691

7. In the edit box [3], enter the name of the EtherNet/IP™ interface with which the data are stored in the controller tags.
8. Enter the IP address of the EtherNet/IP™ interface in the edit box [2].
9. Click the button [4].  
⇒ The following window is displayed.



15117195019

10. Select the communication format and the process data arrangement.
  - ⇒ You can select up to 32 PI/PO (process input data/process output data words) with 16 Bit respectively. The MOVIFIT® unit usually uses 5 PI/PO for communication with the power section and the control. By selecting the data type SINT, a data array with 10 bytes is created by the software.
11. Click [OK].
  - ⇒ The previous window opens.
12. Open the tab [1].



15117198347

13. Enter a cycle time (data rate) in the edit box [2]. The unit supports a cycle time of a minimum of 5 ms. Longer cycle times can be implemented without any problems.
14. Choose the input type from the drop-down list [3]. Depending on the network configuration, e.g. if a redundant master or an HMI panel is integrated in the network, you can either select "Unicast" or Multicast" connection.
15. Click [OK].
  - ⇒ The device is included in the project and the settings are adopted.



## 6.3 Device Level Ring topology

### 6.3.1 Description

#### INFORMATION



The MOVIFIT® unit only supports announce telegrams. Beacon telegrams on the fieldbus are ignored and just forwarded by the MOVIFIT® unit.

If a **Device Level Ring** topology (DLR topology) is used, 2 new telegrams are shown on the fieldbus. Both telegrams can be used to detect single fault locations in the ring.

- **Announce telegrams** are sent cyclically every 1 s.

No special hardware of the ring components is required to process the announce telegrams.

The MOVIFIT® unit only supports announce telegrams.

- **Beacon telegrams** are sent cyclically every 400 µs by the ring supervisor.

A special hardware of the devices in the ring is required to process the beacon telegrams.

Beacon telegrams are ignored and just forwarded by the MOVIFIT® unit.

### 6.3.2 Ring fault detection

If Beacon telegrams that are sent to the first port of the ring supervisor are not received by the second port of the ring supervisor, the ring supervisor detects a ring fault.

If the telegrams do not run through the entire ring, the ring supervisor sends a non-cyclical announce telegram. This non-cyclical announce telegram leads to a status change of the EtherNet/IP™ interface. The network is automatically restored.

#### INFORMATION



Use less than 50 ring nodes in one DLR network. If more than 50 nodes are used in one DLR network, you have to consider the following:

- The risk of faults in the DLR network increases.
- The times for fault rectification in a faulty DLR network increase.

→ If your application requires more than 50 nodes, Rockwell Automation recommends to split up the nodes in separate but linked DLR networks.<sup>1)</sup>

1) See user guideline by Rockwell Automation "EtherNet/IP Embedded Switch Technology – Linear and Device-level Ring Topologies", Appendix A

### 6.3.3 Ring fault rectification

If a single fault location in the ring causes a fault and the rectification takes longer than the fieldbus timeout interval, you can increase the fieldbus timeout (timeout interval) by increasing the cycle time.

The timeout interval of the device is calculated as follows:

$$T_{\text{Timeout}} = RPI \times 32$$

$T_{\text{Timeout}}$       Timeout interval (fieldbus timeout) in ms  
RPI                Cycle time RPI (Requested Packet Interval) in ms

The unit supports a cycle time of a minimum of 5 ms.

The minimum timeout interval of the fieldbus is thus 160 ms ( $5 \times 32$ ).

#### 6.3.4 Hardware and software configuration

There is no need to make any special settings in the EtherNet/IP™ interface for the configuration of a DLR network. All configurations are carried out in the ring supervisor.

### INFORMATION



For information on this configuration, refer to the user guideline by Rockwell Automation "EtherNet/IP™ Embedded Switch Technology – Linear and Device Level Ring Topologies" that is available on the Rockwell website.

## 6.4 Requirements to the MOVIFIT® unit for fieldbus operation

For fieldbus operation of a MOVIFIT® unit, the following devices must be started up:

- Integrated power section (with MOVIFIT® SC/FC)
- Connected MOVIMOT® inverter (with MOVIFIT® MC)
- Connected MOVIFIT® slaves

In addition, the MOVIFIT® control board requires an IEC program.

As standard, MOVIFIT® function level "Technology" is delivered with the "Transparent mode" IEC program. Other IEC programs can be loaded on the MOVIFIT® control board according to the required functionality.

The required number of process data words is defined in the IEC program (see chapter "Configuration in transparent mode" (→ 208)). The "SF/USR" LED indicates whether an IEC program has been loaded or started (see chapter "SF/USR LED" (→ 38)). For further information on the currently loaded IEC program, refer to the parameter tree in the MOVITOOLS® MotionStudio engineering software under "Display values" > "Unit data".

Start the PLC Editor via [Programming] in the context menu. Use the MOVI-PLC® Editor to create programs and load them to the MOVIFIT® unit.

## 6.5 Project planning examples

### 6.5.1 Configuring process data exchange

The following example describes the configuration of the process data exchange between EtherNet/IP™ master and MOVIFIT® function level "Technology" in Studio 5000 Logix Designer.

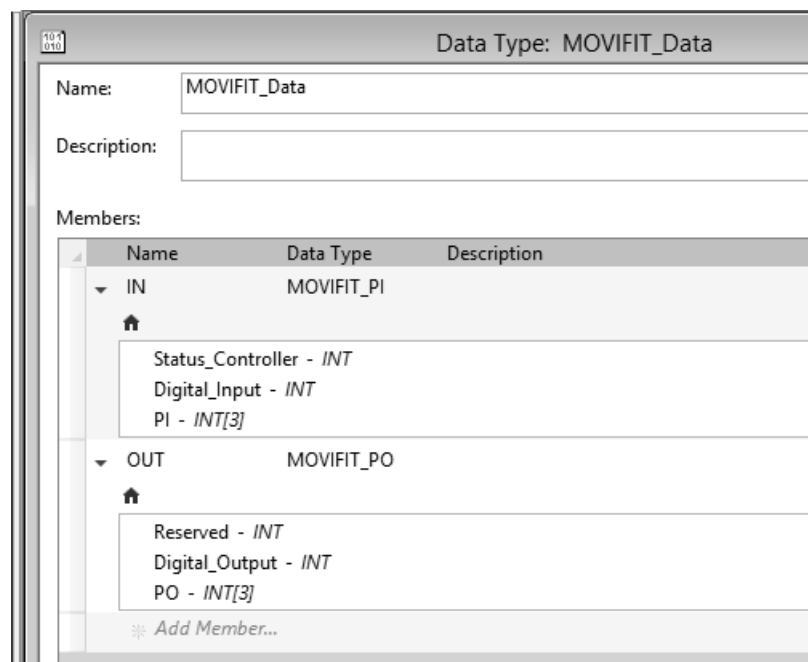
### INFORMATION



This description applies to all versions of the programming software Studio 5000 Logix Designer (up to version V20: RSLogix 5000).

Proceed as follows:

1. Start up the MOVIFIT® unit (see chapter "Startup" (→ 22)).
2. Set the IP address parameters of the MOVIFIT® unit (see chapter "Setting the IP address parameters" (→ 28)).
3. Include the MOVIFIT® unit in the configuration for the "I/O Configuration" in Studio 5000 Logix Designer (see chapter "Configuration of the EtherNet/IP™ master" (→ 46)).
4. Create a user-defined data type. It allows you to organize the process data in a structure and simplifies access to the data elements.



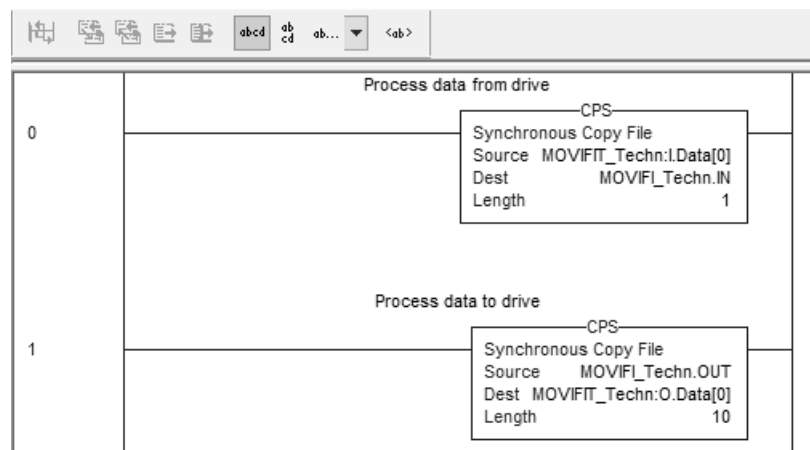
15123040267

- ⇒ You can access the process data interface with explicit variable names with the created data type.

| Name                              | Usage | Value   | Force Mask | Style | Data Type    | Description                 |
|-----------------------------------|-------|---------|------------|-------|--------------|-----------------------------|
| MOVIFI_Techn                      | Local | {...}   | {...}      |       | MOVIFIT_Data |                             |
| MOVIFI_Techn.IN                   |       | {...}   | {...}      |       | MOVIFIT_PI   |                             |
| MOVIFI_Techn.IN.Status_Controller |       | 16#0000 |            | Hex   | INT          | Status Word control section |
| MOVIFI_Techn.IN.Digital_Input     |       | 16#0000 |            | Hex   | INT          | Digital Inputs              |
| MOVIFI_Techn.IN.PI                |       | {...}   | {...}      | Hex   | INT[3]       |                             |
| MOVIFI_Techn.IN.PI[0]             |       | 16#0407 |            | Hex   | INT          | Status Word 1 MOVIFIT       |
| MOVIFI_Techn.IN.PI[1]             |       | 16#005e |            | Hex   | INT          | Actual Output Current       |
| MOVIFI_Techn.IN.PI[2]             |       | 16#0007 |            | Hex   | INT          | Status Word 2 MOVIFIT       |
| MOVIFI_Techn.OUT                  |       | {...}   | {...}      |       | MOVIFIT_PO   |                             |
| MOVIFI_Techn.OUT.Reserved         |       | 16#0000 |            | Hex   | INT          |                             |
| MOVIFI_Techn.OUT.Digital_Output   |       | 16#0000 |            | Hex   | INT          | Digital Outputs             |
| MOVIFI_Techn.OUT.PO               |       | {...}   | {...}      | Hex   | INT[3]       |                             |
| MOVIFI_Techn.OUT.PO[0]            |       | 16#0006 |            | Hex   | INT          | Control Word                |
| MOVIFI_Techn.OUT.PO[1]            |       | 16#0400 |            | Hex   | INT          | Speed [%]                   |
| MOVIFI_Techn.OUT.PO[2]            |       | 16#0000 |            | Hex   | INT          | Ramp                        |

15123639563

5. To enable process data exchange between the MOVIFIT® unit and the control, insert CPS instructions at the beginning of the MainRoutine. The length designation in the CPS instructions depends on the data type of the destination.
  - ⇒ During copying of the data in the user-defined data structure (from controller to MOVIFIT®), the values of a structure are copied.
  - ⇒ During copying of the data from the user-defined data structure to the output data (from MOVIFIT® to controller), 10 bytes (SINT) are copied.



15123043723

6. Save the project and transfer it to the controller.

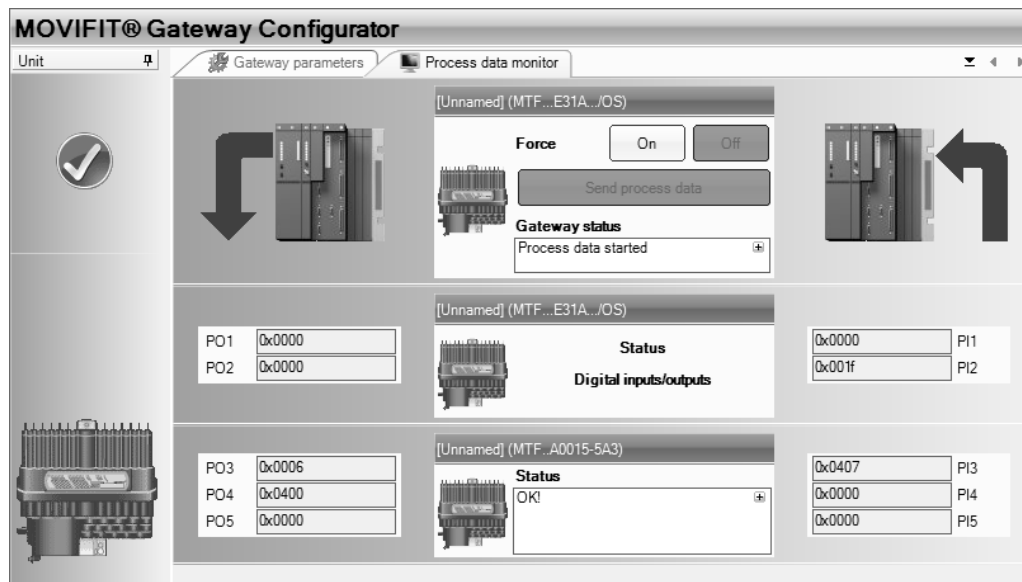
7. Switch to RUN mode of the controller.

| Name                              | Usage | Value   | Force Mask | Style | Data Type    | Description                 |
|-----------------------------------|-------|---------|------------|-------|--------------|-----------------------------|
| MOVIFI_Techn                      | Local | {...}   | {...}      |       | MOVIFIT_Data |                             |
| MOVIFI_Techn.IN                   |       | {...}   | {...}      |       | MOVIFIT_PI   |                             |
| MOVIFI_Techn.IN.Status_Controller |       | 16#0000 |            | Hex   | INT          | Status Word control section |
| MOVIFI_Techn.IN.Digital_Input     |       | 16#0000 |            | Hex   | INT          | Digital Inputs              |
| MOVIFI_Techn.IN.PI                |       | {...}   | {...}      | Hex   | INT[3]       |                             |
| MOVIFI_Techn.IN.PI[0]             |       | 16#0407 |            | Hex   | INT          | Status Word 1 MOVIFIT       |
| MOVIFI_Techn.IN.PI[1]             |       | 16#005e |            | Hex   | INT          | Actual Output Current       |
| MOVIFI_Techn.IN.PI[2]             |       | 16#0007 |            | Hex   | INT          | Status Word 2 MOVIFIT       |
| MOVIFI_Techn.OUT                  |       | {...}   | {...}      |       | MOVIFIT_PO   |                             |
| MOVIFI_Techn.OUT.Reserved         |       | 16#0000 |            | Hex   | INT          |                             |
| MOVIFI_Techn.OUT.Digital_Output   |       | 16#0000 |            | Hex   | INT          | Digital Outputs             |
| MOVIFI_Techn.OUT.PO               |       | {...}   | {...}      | Hex   | INT[3]       |                             |
| MOVIFI_Techn.OUT.PO[0]            |       | 16#0006 |            | Hex   | INT          | Control Word                |
| MOVIFI_Techn.OUT.PO[1]            |       | 16#0400 |            | Hex   | INT          | Speed [%]                   |
| MOVIFI_Techn.OUT.PO[2]            |       | 16#0000 |            | Hex   | INT          | Ramp                        |

15123639563

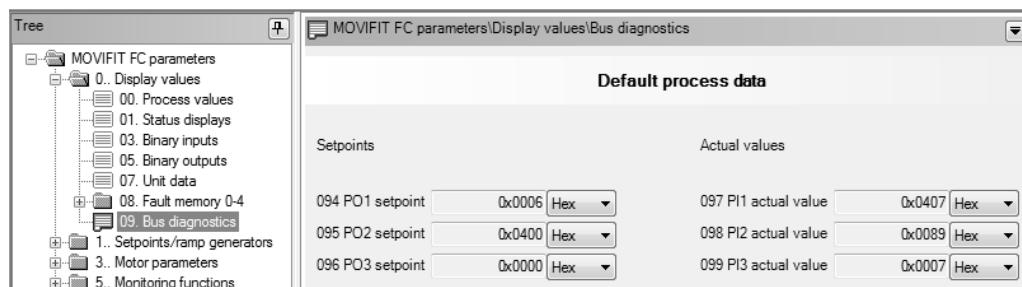
8. Check if the process data correspond to the following values:

⇒ To the values that are displayed in the Gateway Configurator software.



15123832459

⇒ To the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software.



15123840395

### 6.5.2 Access to device parameters with RSLogix 5000

The procedure to access device parameters depends on the version of the RSLogix 5000 programming software and the firmware version of the MOVIFIT® unit (support of DLR topology).

| Service            | RSLogix 5000 up to version V19 |                | RSLogix 5000 as of version V20 |                |
|--------------------|--------------------------------|----------------|--------------------------------|----------------|
|                    | DLR support                    | No DLR support | DLR support                    | No DLR support |
| GetAttributeSingle | x                              | x              | –                              | x              |
| SetAttributeSingle | x                              | x              | –                              | x              |
| Custom             | –                              | –              | x                              | –              |

The SEW parameter channel has the following structure:

|       |      |          |          |              |              |              |              |
|-------|------|----------|----------|--------------|--------------|--------------|--------------|
| Index | Data | Subindex | Reserved | Subaddress 1 | Subchannel 1 | Subaddress 2 | Subchannel 2 |
|-------|------|----------|----------|--------------|--------------|--------------|--------------|

15214071179

For MOVIFIT® function level "Technology" with EtherNet/IP™ interface, the routing information Subaddress 1 and Subchannel 1 are used. The device parameter can only be addressed with index and subindex. The routing information Subaddress 2 and Subchannel 2 are not used.

Enter the following values for the routing information:

| Routing information | Value                         |               |
|---------------------|-------------------------------|---------------|
|                     | Control electronics/field-bus | Power section |
| Subaddress 1        | 0                             | 1             |
| Subchannel 1        | 0                             | 2             |
| Subaddress 2        | 0                             | 0             |
| Subchannel 2        | 0                             | 0             |

## Access to device parameters without DLR support with RSLogix 5000 up to version V19

The following example describes the configuration of read and write access to the MOVIFIT® device parameter with RSLogix 5000, Version V19.

### Reading parameters

Proceed as follows:

1. Create the user-defined data type "SEW\_Parameter\_Channel". It allows you to organize the process data in a structure and simplifies access to the data elements.

## INFORMATION



To ensure proper operation of the parameter channel, you must **not** change the order of the variables. The data types must match the figure.

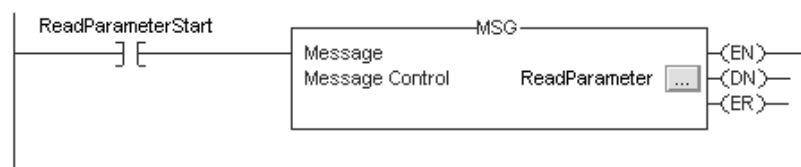
| Name        | Data Type | Style   |
|-------------|-----------|---------|
| Reserved1   | INT       | Decimal |
| Index       | INT       | Decimal |
| Data        | DINT      | Hex     |
| Subindex    | SINT      | Decimal |
| Reserved2   | SINT      | Decimal |
| SubAddress1 | SINT      | Decimal |
| SubChannel1 | SINT      | Decimal |
| SubAddress2 | SINT      | Decimal |
| SubChannel2 | SINT      | Decimal |

15657786891

2. Create the following controller tags:

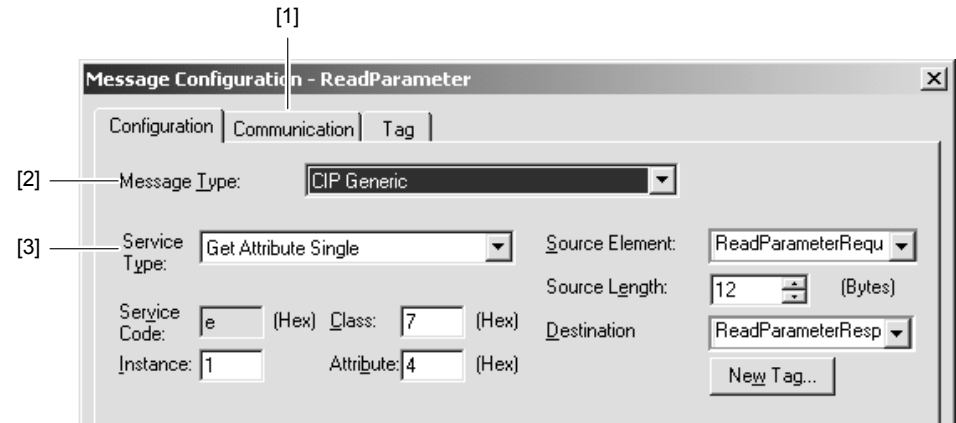
| Name                  | Data structure        |
|-----------------------|-----------------------|
| ReadParameter         | MESSAGE               |
| ReadParameterRequest  | SEW_Parameter_Channel |
| ReadParameterResponse | SEW_Parameter_Channel |
| ReadParameterStart    | BOOL                  |

3. To be able to perform the read request, adapt the program of the controller as follows:



9007200127654795

- Click the button  in the MSG block.  
⇒ The following window is displayed.

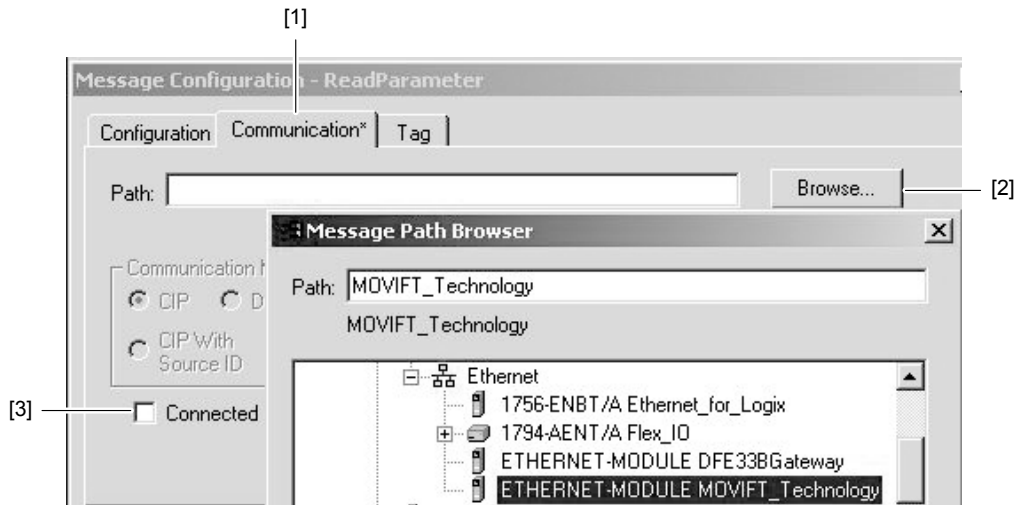


9007200127693963

- Select the setting "CIP Generic" from the drop-down list [2].
- Make the following settings in the specified sequence.  
⇒ The drop-down list [3] is automatically set to "Get Attribute Single" after the entries are applied.

| Window element        | Setting/value               |
|-----------------------|-----------------------------|
| Source Element        | ReadParameterRequest.Index  |
| Source Length (Bytes) | 12                          |
| Destination           | ReadParameterResponse.Index |
| Service Code (Hex)    | e                           |
| Class (Hex)           | 7                           |
| Instance              | 1                           |
| Attribute (Hex)       | 4                           |

- Open the tab [1].



9007200881386635

21361797/EN – 12/2015



8. Click the button [2].  
⇒ A module manager is displayed.
9. Via "I/O configuration" > "Ethernet", select the target device with which you want to establish communication.
10. Do **not** activate the check box [3]. Both the controller and the MOVIFIT® unit only allow a limited number of connections.
11. Save the project and transfer it to the controller.
12. Enter the following controller tags values:

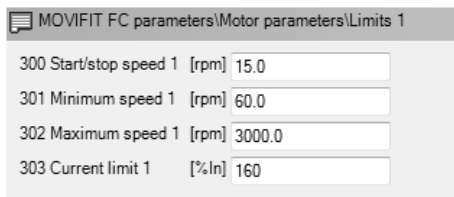
| Name                               | Value   | Force Mask | Style   | Data Type         |
|------------------------------------|---------|------------|---------|-------------------|
| ReadParameter_Start                | 1       |            | Decimal | BOOL              |
| ReadParameter_Response             | {...}   | {...}      |         | SEW_ParameterC... |
| ReadParameter_Response.Index       | 8517    |            | Decimal | INT               |
| ReadParameter_Response.Data_LOW    | -14656  |            | Decimal | INT               |
| ReadParameter_Response.Data_HIGH   | 45      |            | Decimal | INT               |
| ReadParameter_Response.SubIndex    | 0       |            | Decimal | SINT              |
| ReadParameter_Response.Reserved    | 0       |            | Decimal | SINT              |
| ReadParameter_Response.SubAddress1 | 2       |            | Decimal | SINT              |
| ReadParameter_Response.SubChannel1 | 1       |            | Decimal | SINT              |
| ReadParameter_Response.SubAddress2 | 0       |            | Decimal | SINT              |
| ReadParameter_Response.SubChannel2 | 0       |            | Decimal | SINT              |
| ReadParameter_Request              | {...}   | {...}      |         | SEW_ParameterC... |
| ReadParameter_Request.Index        | 8517    |            | Decimal | INT               |
| ReadParameter_Request.Data_LOW     | 0       |            | Decimal | INT               |
| ReadParameter_Request.Data_HIGH    | 0       |            | Decimal | INT               |
| ReadParameter_Request.SubIndex     | 0       |            | Decimal | SINT              |
| ReadParameter_Request.Reserved     | 0       |            | Decimal | SINT              |
| ReadParameter_Request.SubAddress1  | 2       |            | Decimal | SINT              |
| ReadParameter_Request.SubChannel1  | 1       |            | Decimal | SINT              |
| ReadParameter_Request.SubAddress2  | 0       |            | Decimal | SINT              |
| ReadParameter_Request.SubChannel2  | 0       |            | Decimal | SINT              |
| ReadParameter_Data                 | 3000000 |            | Decimal | DINT              |
| ReadParameter                      | {...}   | {...}      |         | MESSAGE           |

9007200845318155

| Controller tag                     | Value                             |
|------------------------------------|-----------------------------------|
| ReadParameterStart                 | 1                                 |
| ReadParameterRequest.Index         | Index of the parameter to be read |
| ReadParameter_Request.SubAddress 1 | 2                                 |
| ReadParameter_Request.SubChannel 1 | 1                                 |
| ReadParameter_Request.SubAddress 2 | 0                                 |
| ReadParameter_Request.SubChannel 2 | 0                                 |

13. Switch to RUN mode of the controller.  
⇒ The read request is executed once.  
⇒ If the read request is answered, the controller tag "ReadParameterResponse.Index" displays the read index. The controller tag "ReadParameterResponse.Data" contains the read data.  
⇒ In this example, the value (3000 min<sup>-1</sup>) of the parameter *P302 maximum speed* (Index 8517.0) was read.

14. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software.



MOVIFIT FC parameters\Motor parameters\Limits 1

|                        |       |        |
|------------------------|-------|--------|
| 300 Start/stop speed 1 | [rpm] | 15.0   |
| 301 Minimum speed 1    | [rpm] | 60.0   |
| 302 Maximum speed 1    | [rpm] | 3000.0 |
| 303 Current limit 1    | [%In] | 160    |

15215579659

⇒ The tooltip displays index, subindex, factor, etc. of the parameter.

## Writing parameters

Proceed as follows:

1. Create the user-defined data type "SEW\_Parameter\_Channel". It allows you to organize the process data in a structure and simplifies access to the data elements.

## INFORMATION



To ensure proper operation of the parameter channel, you must **not** change the order of the variables. The data types must match the figure.

The screenshot shows the 'User-Defined' data type 'SEW\_Parameter\_Channel' in the software interface. The 'Members' table is as follows:

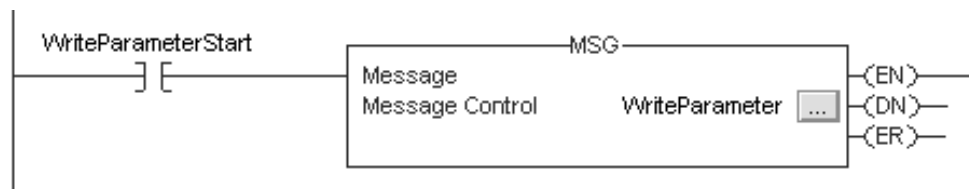
| Name        | Data Type | Style   |
|-------------|-----------|---------|
| Reserved1   | INT       | Decimal |
| Index       | INT       | Decimal |
| Data        | DINT      | Hex     |
| Subindex    | SINT      | Decimal |
| Reserved2   | SINT      | Decimal |
| SubAddress1 | SINT      | Decimal |
| SubChannel1 | SINT      | Decimal |
| SubAddress2 | SINT      | Decimal |
| SubChannel2 | SINT      | Decimal |

15657786891

2. Create the following controller tags:

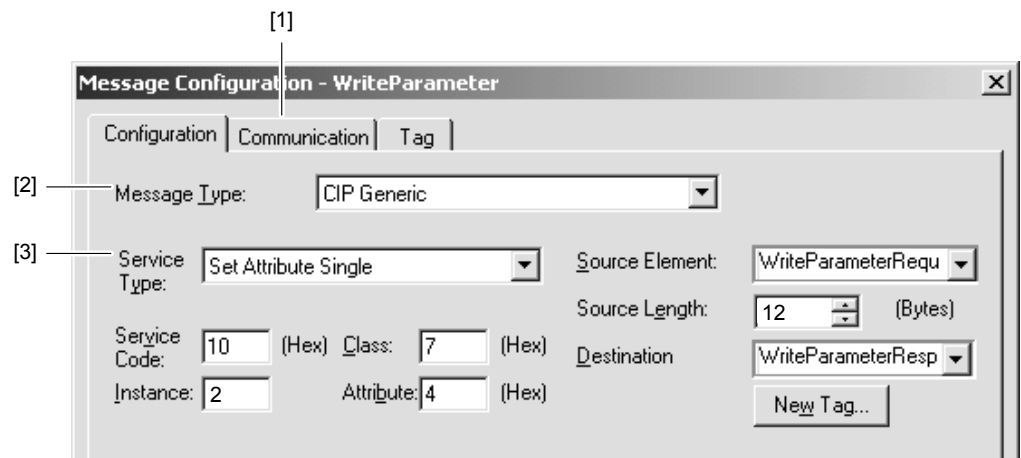
| Name                   | Data structure        |
|------------------------|-----------------------|
| WriteParameter         | MESSAGE               |
| WriteParameterRequest  | SEW_Parameter_Channel |
| WriteParameterResponse | SEW_Parameter_Channel |
| WriteParameterStart    | BOOL                  |

3. To be able to perform the write request, adapt the program of the controller as follows:



9007200127838347

- Click the button  in the MSG block.  
⇒ The following window is displayed.

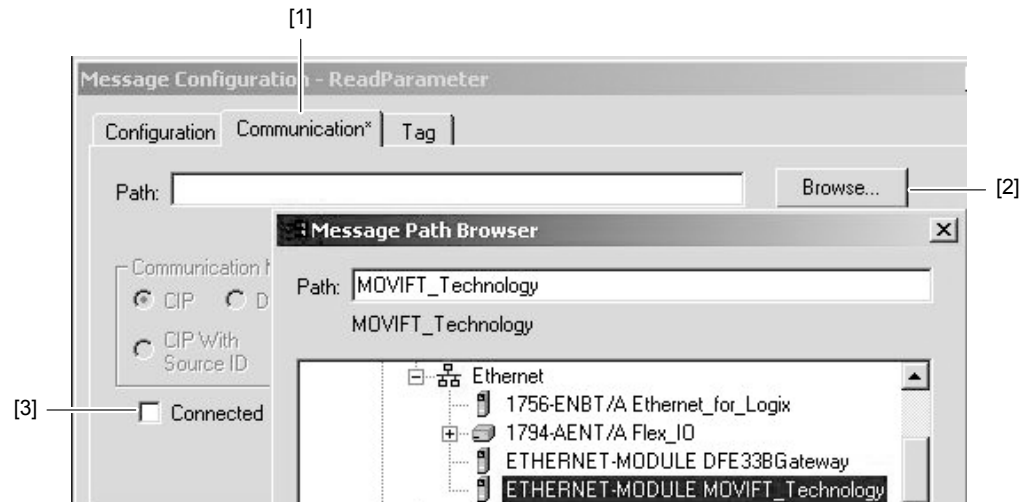


9007200845377675

- Select the setting "CIP Generic" from the drop-down list [2].
- Make the following settings in the specified sequence.  
⇒ The drop-down list [3] is automatically set to "SetAttributeSingle" after the entries are applied.

| Window element        | Setting/value                |
|-----------------------|------------------------------|
| Source Element        | WriteParameterRequest.Index  |
| Source Length (Bytes) | 12                           |
| Destination           | WriteParameterResponse.Index |
| Service Code (Hex)    | 10                           |
| Class (Hex)           | 7                            |
| Instance              | 2                            |
| Attribute (Hex)       | 4                            |

7. Open the tab [1].



9007200881386635

8. Click the button [2].  
⇒ A module manager is displayed.
9. Via "I/O configuration" > "Ethernet", select the target device with which you want to establish communication.
10. Do **not** activate the check box [3]. Both the controller and the MOVIFIT® unit only allow a limited number of connections.
11. Save the project and transfer it to the controller.
12. Enter the following controller tags values:

| Name                                | Value   | Force Mask | Style   | Data Type         |
|-------------------------------------|---------|------------|---------|-------------------|
| WriterParameter_Start               | 1       |            | Decimal | BOOL              |
| WriteParameter_Response             | {...}   | {...}      |         | SEW_ParameterC... |
| WriteParameter_Response.Index       | 8517    |            | Decimal | INT               |
| WriteParameter_Response.Data_LOW    | 16#c6c0 |            | Hex     | INT               |
| WriteParameter_Response.Data_HIGH   | 16#002d |            | Hex     | INT               |
| WriteParameter_Response.SubIndex    | 0       |            | Decimal | SINT              |
| WriteParameter_Response.Reserved    | 0       |            | Decimal | SINT              |
| WriteParameter_Response.SubAddress1 | 2       |            | Decimal | SINT              |
| WriteParameter_Response.SubChannel1 | 1       |            | Decimal | SINT              |
| WriteParameter_Response.SubAddress2 | 0       |            | Decimal | SINT              |
| WriteParameter_Response.SubChannel2 | 0       |            | Decimal | SINT              |
| WriteParameter_Request              | {...}   | {...}      |         | SEW_ParameterC... |
| WriteParameter_Request.Index        | 8517    |            | Decimal | INT               |
| WriteParameter_Request.Data_LOW     | 16#c6c0 |            | Hex     | INT               |
| WriteParameter_Request.Data_HIGH    | 16#002d |            | Hex     | INT               |
| WriteParameter_Request.SubIndex     | 0       |            | Decimal | SINT              |
| WriteParameter_Request.Reserved     | 0       |            | Decimal | SINT              |
| WriteParameter_Request.SubAddress1  | 2       |            | Decimal | SINT              |
| WriteParameter_Request.SubChannel1  | 1       |            | Decimal | SINT              |
| WriteParameter_Request.SubAddress2  | 0       |            | Decimal | SINT              |
| WriteParameter_Request.SubChannel2  | 0       |            | Decimal | SINT              |
| WriteParameter_Data                 | 3000000 |            | Decimal | DINT              |

9007200845445515

| Controller tag                      | Value                                |
|-------------------------------------|--------------------------------------|
| WriteParameterStart                 | 1                                    |
| WriteParameterRequest.Index         | Index of the parameter to be written |
| WriteParameterRequest.Data          | Value to be written in the parameter |
| WriteParameter_Request.SubAddress 1 | 2                                    |
| WriteParameter_Request.SubChannel 1 | 1                                    |
| WriteParameter_Request.SubAddress 2 | 0                                    |
| WriteParameter_Request.SubChannel 2 | 0                                    |

13. Switch to RUN mode of the controller.

- ⇒ The write request is executed once.
- ⇒ If the write request is answered, the controller tag "WriteParameterResponse.Index" displays the written index. The controller tag "WriteParameterResponse.Data" contains the written data.
- ⇒ In this example, the parameter *P302 maximum speed* was set to 3000 min<sup>-1</sup>.

14. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software or in PLC Editor.

#### Access to device parameters with DLR support with RSLogix 5000 as of version V20

The following example describes the configuration of read and write access to the MOVIFIT® device parameter with Studio 5000 Logix Designer, Version V25 (up to version V29: RSLogix 5000).

You can access the MOVIFIT® device parameter as follows:

- Via the SEW parameter channel (data length 12 bytes) in process data  
Access is only possible with the gateway program from MOVIFIT® function level "Technology" as of version V13.2.
- Via CIP message service  
The access is possible with all versions of the MOVIFIT® unit.

### INFORMATION



This chapter describes the access to the MOVIFIT® device parameter via the CIP message service. For information on the access via the SEW parameter channel, refer to the "Application Configurator for CCU" manual.

## Reading parameters

Proceed as follows:

1. Create the user-defined data type "SEW\_ParameterChannel". It allows you to organize the process data in a structure and simplifies access to the data elements.

## INFORMATION



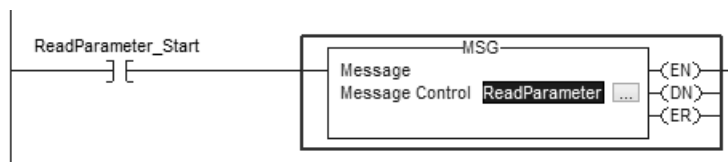
To ensure proper operation of the parameter channel, you must **not** change the order of the variables. The data types must match the figure.

15215509003

2. Create the following controller tags:

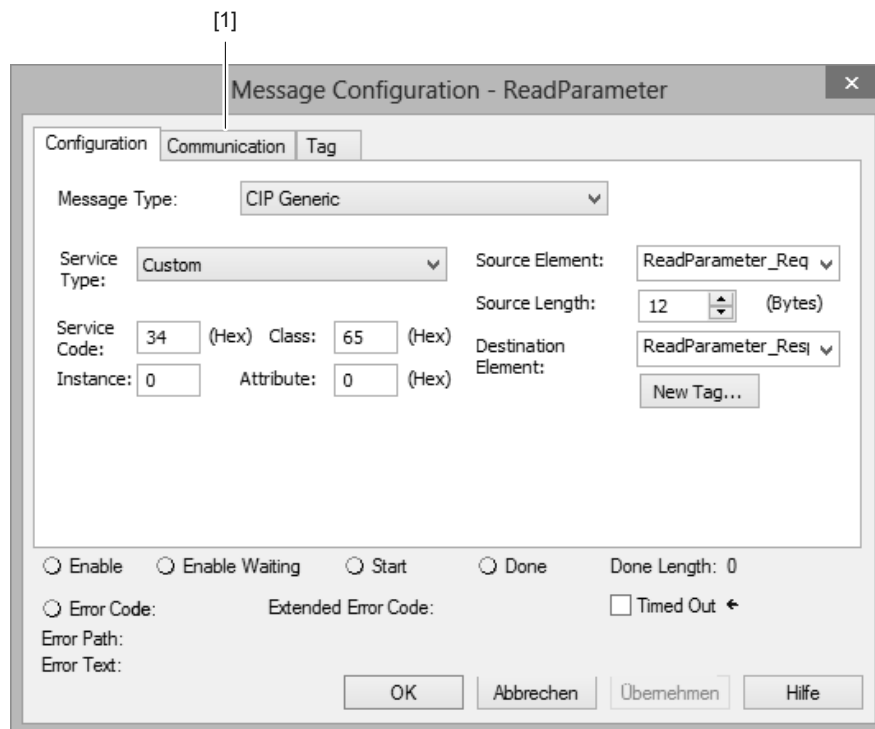
| Name                   | Data structure       |
|------------------------|----------------------|
| ReadParameter_Start    | BOOL                 |
| ReadParameter_Response | SEW_ParameterChannel |
| ReadParameter_Request  | SEW_ParameterChannel |
| ReadParameter_Data     | DINT                 |
| ReadParameter          | MESSAGE              |

3. To be able to perform the read request, adapt the program of the controller as follows:



15215567499

- Click the button  in the MSG block.  
⇒ The following window is displayed.



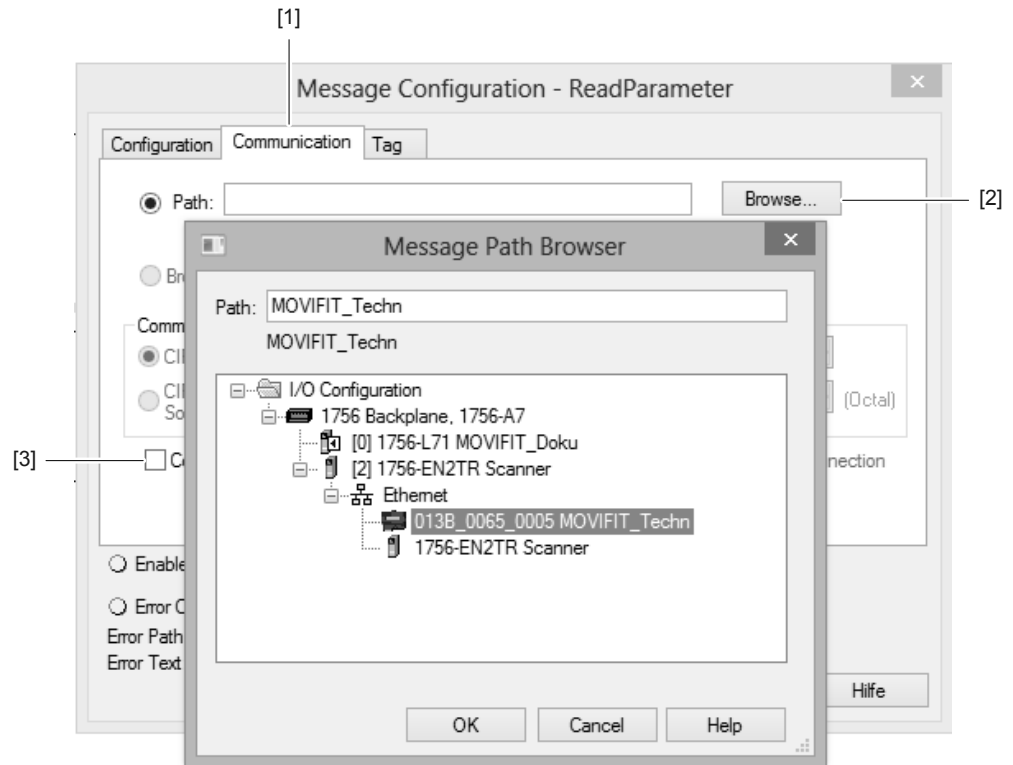
15215569931

- Make the following settings in the specified sequence.

| Window element        | Setting/value                |
|-----------------------|------------------------------|
| Source Element        | ReadParameter_Request.Index  |
| Source Length (Bytes) | 12                           |
| Destination Element   | ReadParameter_Response.Index |
| Service Code (Hex)    | 34                           |
| Class (Hex)           | 65                           |
| Instance              | 0                            |
| Attribute (Hex)       | 0                            |

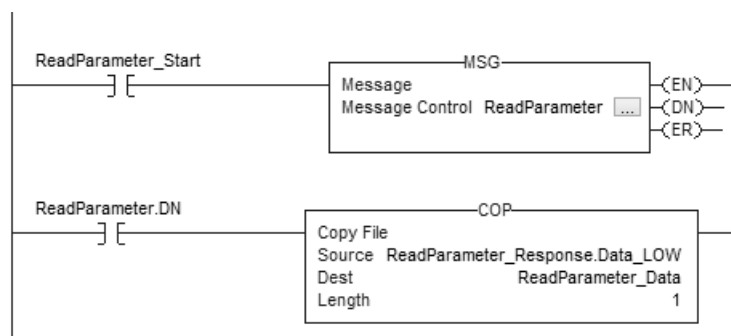


6. Open the tab [1].



15215572363

7. Click the button [2].  
⇒ A module manager is displayed.
8. Via "I/O configuration" > "Ethernet", select the target device with which you want to establish communication.
9. Do **not** activate the check box [3]. Both the controller and the MOVIFIT® unit only allow a limited number of connections.
10. Add the following additional "COP" command to the controller program. The "COP" command copies both INT variables "ReadParameter\_Request.Data\_LOW" and "ReadParameter\_Request.Data\_HIGH" to the DINT variable "ReadParameter\_Data":



15215574795

11. Save the project and transfer it to the controller.

12. Enter the following controller tags values:

| Name                                 | Value   | Force Mask | Style   | Data Type         |
|--------------------------------------|---------|------------|---------|-------------------|
| ReadParameter_Start                  | 1       |            | Decimal | BOOL              |
| ReadParameter_Response               | {...}   | {...}      |         | SEW_ParameterC... |
| + ReadParameter_Response.Index       | 8517    |            | Decimal | INT               |
| + ReadParameter_Response.Data_LOW    | -14656  |            | Decimal | INT               |
| + ReadParameter_Response.Data_HIGH   | 45      |            | Decimal | INT               |
| + ReadParameter_Response.SubIndex    | 0       |            | Decimal | SINT              |
| + ReadParameter_Response.Reserved    | 0       |            | Decimal | SINT              |
| + ReadParameter_Response.SubAddress1 | 1       |            | Decimal | SINT              |
| + ReadParameter_Response.SubChannel1 | 2       |            | Decimal | SINT              |
| + ReadParameter_Response.SubAddress2 | 0       |            | Decimal | SINT              |
| + ReadParameter_Response.SubChannel2 | 0       |            | Decimal | SINT              |
| ReadParameter_Request                | {...}   | {...}      |         | SEW_ParameterC... |
| + ReadParameter_Request.Index        | 8517    |            | Decimal | INT               |
| + ReadParameter_Request.Data_LOW     | 0       |            | Decimal | INT               |
| + ReadParameter_Request.Data_HIGH    | 0       |            | Decimal | INT               |
| + ReadParameter_Request.SubIndex     | 0       |            | Decimal | SINT              |
| + ReadParameter_Request.Reserved     | 0       |            | Decimal | SINT              |
| + ReadParameter_Request.SubAddress1  | 1       |            | Decimal | SINT              |
| + ReadParameter_Request.SubChannel1  | 2       |            | Decimal | SINT              |
| + ReadParameter_Request.SubAddress2  | 0       |            | Decimal | SINT              |
| + ReadParameter_Request.SubChannel2  | 0       |            | Decimal | SINT              |
| + ReadParameter_Data                 | 3000000 |            | Decimal | DINT              |

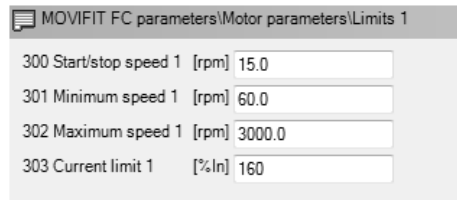
15215577227

| Controller tag                     | Value                             |
|------------------------------------|-----------------------------------|
| ReadParameter_Start                | 1                                 |
| ReadParameter_Request.Index        | Index of the parameter to be read |
| ReadParameter_Request.SubAddress 1 | 1                                 |
| ReadParameter_Request.SubChannel 1 | 2                                 |
| ReadParameter_Request.SubAddress 2 | 0                                 |
| ReadParameter_Request.SubChannel 2 | 0                                 |

13. Switch to RUN mode of the controller.

- ⇒ The read request is executed once.
- ⇒ If the read request is answered, the controller tag "ReadParameter\_Response.Index" displays the read index. The controller tags "ReadParameter\_Response.Data\_LOW" and "ReadParameter\_Response.Data\_HIGH" contain the low word and high word of the read data. The actual data are shown in the "ReadParametersResponse.Data" controller tag.
- ⇒ In this example, the value (3000 min<sup>-1</sup>) of the parameter *P302 maximum speed* (Index 8517.0) was read.

14. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software.



15215579659

⇒ The tooltip displays index, subindex, factor, etc. of the parameter.

### Writing parameters

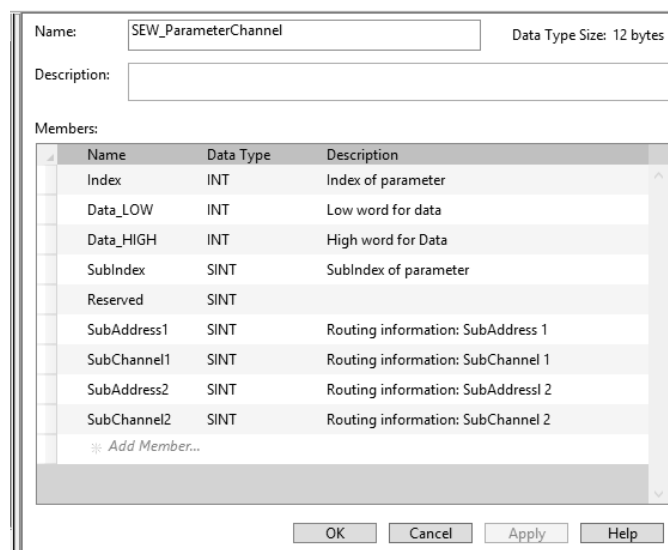
Proceed as follows:

1. Create the user-defined data type "SEW\_ParameterChannel". It allows you to organize the process data in a structure and simplifies access to the data elements.

## INFORMATION



To ensure proper operation of the parameter channel, you must **not** change the order of the variables. The data types must match the figure.

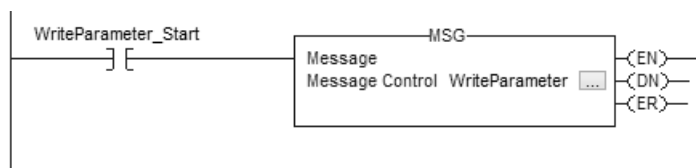


15215509003

2. Create the following controller tags:

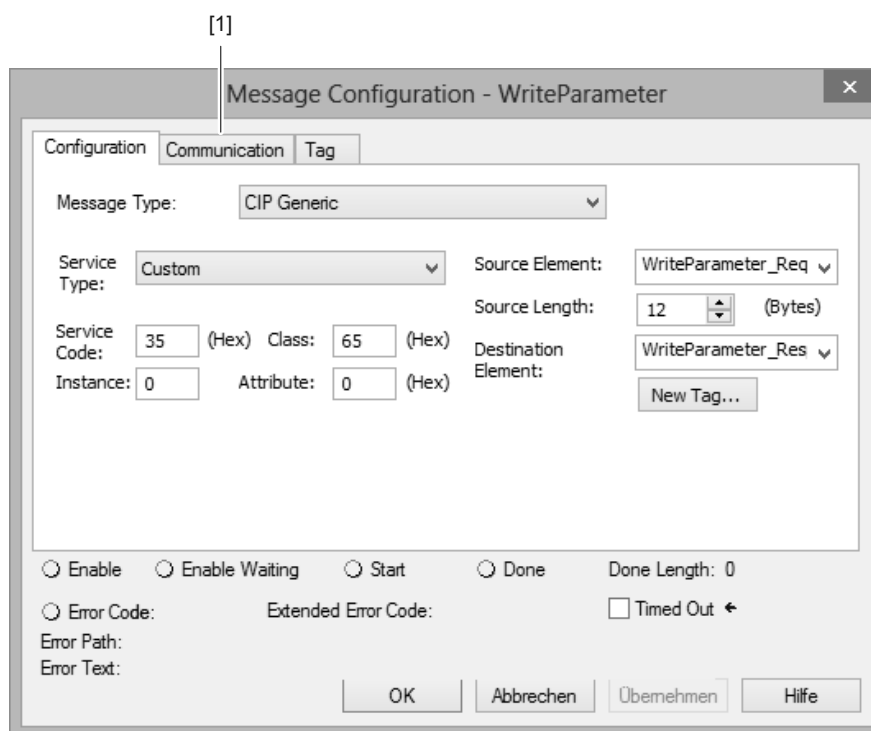
| Name                    | Data structure       |
|-------------------------|----------------------|
| WriteParameter_Start    | BOOL                 |
| WriteParameter_Response | SEW_ParameterChannel |
| WriteParameter_Request  | SEW_ParameterChannel |
| WriteParameter_Data     | DINT                 |
| WriteParameter          | MESSAGE              |

- To be able to perform the write request, adapt the program of the controller as follows:



15215594891

- Click the button in the MSG block.  
⇒ The following window is displayed.

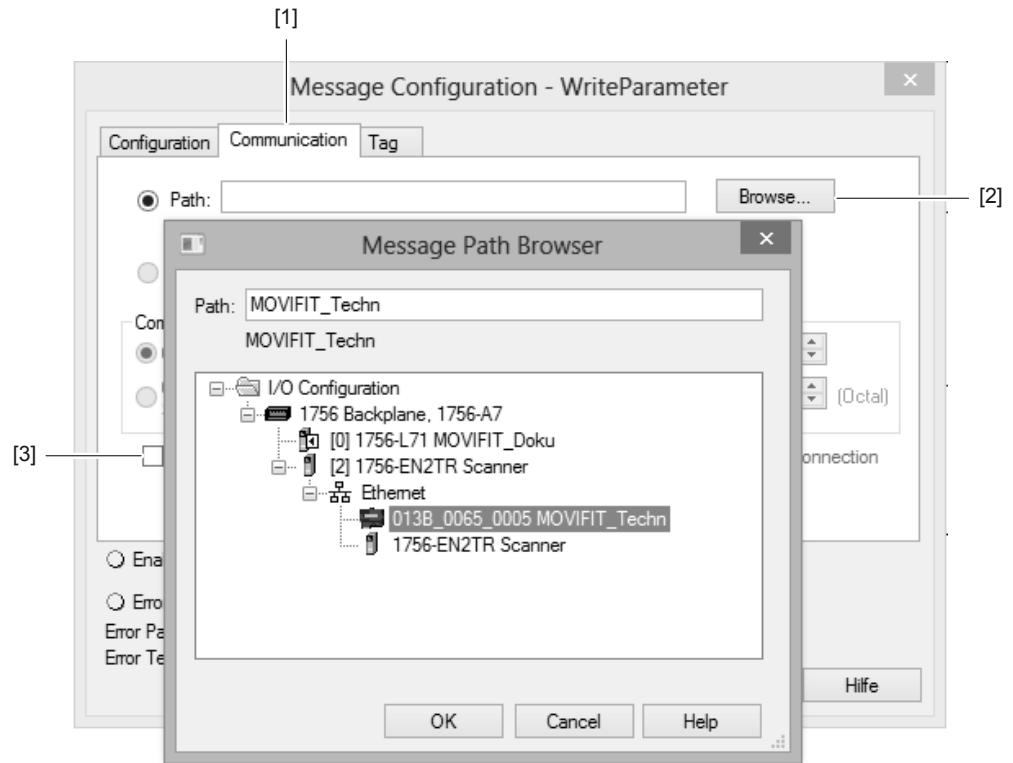


15215597323

- Make the following settings in the specified sequence.

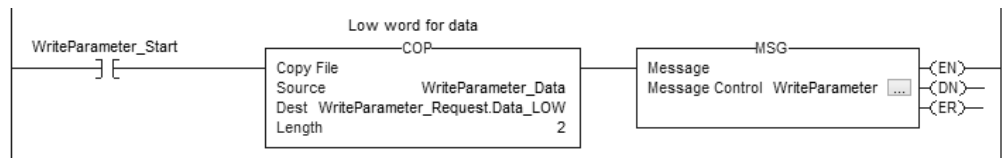
| Window element        | Setting/value                 |
|-----------------------|-------------------------------|
| Source Element        | WriteParameter_Request.Index  |
| Source Length (Bytes) | 12                            |
| Destination Element   | WriteParameter_Response.Index |
| Service Code (Hex)    | 35                            |
| Class (Hex)           | 65                            |
| Instance              | 0                             |
| Attribute (Hex)       | 0                             |

6. Open the tab [1].



15215511435

7. Click the button [2].  
⇒ A module catalog is displayed.
8. Via "I/O configuration" > "Ethernet", select the target device with which you want to establish communication.
9. Do **not** activate the check box [3]. Both the controller and the MOVIFIT® unit only allow a limited number of connections.
10. Add the following additional COP command to the controller program:  
⇒ The COP command copies the DINT variable "WriteParameter\_Data" to the INT variables "WriteParameter\_Request.Data\_LOW" and "WriteParameter\_Request.Data\_HIGH".



15215513867

11. Save the project and transfer it to the controller.
12. Enter the following controller tags values:

| Name                                | Value   | Force Mask | Style   | Data Type         |
|-------------------------------------|---------|------------|---------|-------------------|
| WriteParameter_Start                | 1       |            | Decimal | BOOL              |
| WriteParameter_Response             | {...}   | {...}      |         | SEW_ParameterC... |
| WriteParameter_Response.Index       | 8517    |            | Decimal | INT               |
| WriteParameter_Response.Data_LOW    | 16#c6c0 |            | Hex     | INT               |
| WriteParameter_Response.Data_HIGH   | 16#002d |            | Hex     | INT               |
| WriteParameter_Response.SubIndex    | 0       |            | Decimal | SINT              |
| WriteParameter_Response.Reserved    | 0       |            | Decimal | SINT              |
| WriteParameter_Response.SubAddress1 | 1       |            | Decimal | SINT              |
| WriteParameter_Response.SubChannel1 | 2       |            | Decimal | SINT              |
| WriteParameter_Response.SubAddress2 | 0       |            | Decimal | SINT              |
| WriteParameter_Response.SubChannel2 | 0       |            | Decimal | SINT              |
| WriteParameter_Request              | {...}   | {...}      |         | SEW_ParameterC... |
| WriteParameter_Request.Index        | 8517    |            | Decimal | INT               |
| WriteParameter_Request.Data_LOW     | 16#c6c0 |            | Hex     | INT               |
| WriteParameter_Request.Data_HIGH    | 16#002d |            | Hex     | INT               |
| WriteParameter_Request.SubIndex     | 0       |            | Decimal | SINT              |
| WriteParameter_Request.Reserved     | 0       |            | Decimal | SINT              |
| WriteParameter_Request.SubAddress1  | 1       |            | Decimal | SINT              |
| WriteParameter_Request.SubChannel1  | 2       |            | Decimal | SINT              |
| WriteParameter_Request.SubAddress2  | 0       |            | Decimal | SINT              |
| WriteParameter_Request.SubChannel2  | 0       |            | Decimal | SINT              |
| WriteParameter_Data                 | 3000000 |            | Decimal | DINT              |

15219282443

| Controller tag                      | Value                                |
|-------------------------------------|--------------------------------------|
| WriteParameter_Start                | 1                                    |
| WriteParameter_Request.Index        | Index of the parameter to be written |
| WriteParameter_Data                 | Value to be written in the parameter |
| WriteParameter_Request.SubAddress 1 | 1                                    |
| WriteParameter_Request.SubChannel 1 | 2                                    |
| WriteParameter_Request.SubAddress 2 | 0                                    |
| WriteParameter_Request.SubChannel 2 | 0                                    |

13. Switch to RUN mode of the controller.
  - ⇒ The write request is executed once.
  - ⇒ If the write request is answered, the controller tag "WriteParameter\_Response.Index" displays the written index. The controller tags "WriteParameter\_Response.Data\_HIGH" and "WriteParameter\_Response.Data\_LOW" contain the written data.
  - ⇒ In this example, the parameter *P302 maximum speed* was set to 3000 min<sup>-1</sup>.
14. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software or in PLC Editor.

## 7 Ethernet Industrial Protocol (EtherNet/IP™)

### 7.1 Description

The EtherNet Industrial Protocol (EtherNet/IP™) is an open communication standard based on the classic Ethernet protocols TCP/IP and UDP/IP.

EtherNet/IP™ was defined by the **Open DeviceNet Vendor Association (ODVA)** and **ControlNet International (CI)**.

With EtherNet/IP™, Ethernet technology is expanded to include the CIP (**C**ommon **I**ndustrial **P**rotocol) application protocol. CIP is known in the field of automation engineering because it is also used for DeviceNet™ and ControlNet as an application protocol.

### 7.2 Process data exchange

Up to 32 process data words can be exchanged with an EtherNet/IP™ master (scanner) depending on the use of the MOVIFIT® unit. The process data length sets the EtherNet/IP™ master on opening the connection.

In addition to a controlling "Exclusive Owner Connection", 2 "Listen Only Connections" are possible. This means the actual values of the drive can also be read out by stand-by controllers or visualization devices.

If there is already a controlling connection via Modbus/TCP, you cannot activate an "Exclusive Owner Connection" via EtherNet/IP™ before a power-on reset.

### 7.3 Timeout response

The timeout state is initiated by the unit. The EtherNet/IP™ master sets the timeout interval while establishing a connection. The EtherNet/IP™ specification refers to a "**Re**quested **P**acket **I**nterval (RPI)" rather than a timeout interval in this case.

The timeout interval is displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software. However, you must not change the timeout interval in the engineering software as they can only be activated via fieldbus.

The timeout interval displayed in the parameter tree is calculated by multiplying the Requested Packet Interval (RPI) with the "Timeout Multiplier".

The controller determines the timeout multiplier (4, 8, 16, 32 etc.) so that the timeout interval is > 100 ms.

This timeout interval is retained in the device whenever an "Exclusive Owner Connection" is dropped, and the device switches to timeout state after the timeout interval has elapsed. The timeout state is indicated by the "NS" LED on the front of the unit flashing red.

The timeout state causes the response programmed in the IEC program.

The timeout state can be reset via EtherNet/IP™ as follows:

- Via reset service of the identity object (class 0x01, instance 0x01, undetermined attribute)
- By re-establishing the connection
- Via the reset bit in the control word

## 7.4 CIP object directory

All device data are available via objects in the **Common Industrial Protocol (CIP)**.  
For MOVIFIT® function level "Technology", the following objects are integrated:

| Class<br>hex | Name                      |
|--------------|---------------------------|
| 01           | Identity object           |
| 02           | Message router object     |
| 04           | Assembly object           |
| 06           | Connection manager object |
| 07           | Register object           |
| 0F           | Parameter object          |
| 64           | Vardata object            |
| F5           | TCP/IP interface object   |
| F6           | Ethernet link object      |



### 7.4.1 Identity object

- Contains general information on the EtherNet/IP™ device.
- Class code: 01<sub>hex</sub>

#### Class

| Attribute | Access | Name         | Data type | Default value hex | Description      |
|-----------|--------|--------------|-----------|-------------------|------------------|
| 1         | Get    | Revision     | UINT      | 0001              | Revision 1       |
| 2         | Get    | Max Instance | UINT      | 0001              | Maximum instance |

#### Instance 1

The following table provides an overview via instance 1 of the identity object:

| Attribute | Access | Name           | Data type    | Default value hex      | Description                                                      |
|-----------|--------|----------------|--------------|------------------------|------------------------------------------------------------------|
| 1         | Get    | Vendor ID      | UINT         | 013B                   | SEW-EURODRIVE GmbH & Co KG                                       |
| 2         | Get    | Device Type    | UINT         | 0065                   | Manufacturer-specific type                                       |
| 3         | Get    | Product Code   | UINT         | 005                    | Product no. 5: MOVIFIT® Technology                               |
| 4         | Get    | Revision       | STRUCT of    | –                      | Revision of the identity object, depends on the firmware version |
|           |        | Major Revision | USINT        |                        |                                                                  |
|           |        | Minor Revision | USINT        |                        |                                                                  |
| 5         | Get    | Status         | WORD         | –                      | For coding of the attribute see following table                  |
| 6         | Get    | Serial number  | UDINT        | –                      | Unique serial number                                             |
| 7         | Get    | Product Name   | SHORT_STRING | SEW-MOVIFIT-TECHNOLOGY | Product name                                                     |

#### Coding of attribute 5 "Status"

| Bit     | Name                      | Description                                                                                                                                                                                                                                                                                                     |
|---------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0       | Owned                     | Controlling connection is active.                                                                                                                                                                                                                                                                               |
| 1       | –                         | Reserved                                                                                                                                                                                                                                                                                                        |
| 2       | Configured                | Configuration complete.                                                                                                                                                                                                                                                                                         |
| 3       | –                         | Reserved                                                                                                                                                                                                                                                                                                        |
| 4 – 7   | Extended Device Status    | <ul style="list-style-type: none"> <li>• Value 0000<sub>bin</sub>: Unknown</li> <li>• Value 0010<sub>bin</sub>: At least 1 faulty I/O connection detected</li> <li>• Value 0101<sub>bin</sub>: No I/O connection established</li> <li>• Value 0110<sub>bin</sub>: At least one I/O connection active</li> </ul> |
| 8       | Minor Recoverable Fault   | Minor error that can be remedied                                                                                                                                                                                                                                                                                |
| 9       | Minor Unrecoverable Fault | Minor error that cannot be remedied                                                                                                                                                                                                                                                                             |
| 10      | Major Recoverable Fault   | Major error that can be remedied                                                                                                                                                                                                                                                                                |
| 11      | Major Unrecoverable Fault | Major error that cannot be remedied                                                                                                                                                                                                                                                                             |
| 12 – 15 | –                         | Reserved                                                                                                                                                                                                                                                                                                        |

#### Supported services

The following table shows the services supported by the identity object:

| Service Code hex | Service Name         | Class | Instance |
|------------------|----------------------|-------|----------|
| 01               | Get_Attributes_All   | X     | X        |
| 05               | Reset                | –     | X        |
| 0E               | Get_Attribute_Single | X     | X        |

## 7.4.2 Message router object

- Contains information on the implemented objects.
- Class code: 02<sub>hex</sub>

### Class

| Attrib-ute | Access | Name     | Data type | Default value hex | Description |
|------------|--------|----------|-----------|-------------------|-------------|
| 1          | Get    | Revision | UINT      | 0001              | Revision 1  |

### Instance 1

The following table provides an overview via instance 1 of the identity object:

| Attrib-ute | Access | Name              | Data type        | Default value hex                                                 | Description                                                         |
|------------|--------|-------------------|------------------|-------------------------------------------------------------------|---------------------------------------------------------------------|
| 1          | Get    | Object_List       | STRUCT of        | –                                                                 | Object list comprising:<br>• Number of objects<br>• List of objects |
|            |        | Number            | UINT             | 0009                                                              |                                                                     |
|            |        | Classes           | ARRAY of<br>UINT | 01 00 02 00<br>04 00 06 00<br>07 00 0F 00<br>64 00 F5 00<br>F6 00 |                                                                     |
| 2          | Get    | Number Avail-able | UINT             | 0009                                                              | Maximum number of connections                                       |

### Supported services

The following table shows the services supported by the message router object:

| Service Code hex | Service Name         | Class | Instance |
|------------------|----------------------|-------|----------|
| 01               | Get_Attributes_All   | X     | –        |
| 0E               | Get_Attribute_Single | X     | X        |

### 7.4.3 Assembly object

- Accesses the process data of the device. To exchange cyclic process data, I/O connections are established to the instances of the assembly object.
- Class code: 04<sub>hex</sub>

#### Class

| Attribute | Access | Name         | Data type | Default value hex | Description      |
|-----------|--------|--------------|-----------|-------------------|------------------|
| 1         | Get    | Revision     | UINT      | 0002              | Revision 2       |
| 2         | Get    | Max Instance | UINT      | 0082              | Maximum instance |

#### Instance 160 – PO data range

This instance accesses the process output data of the MOVIFIT® unit. Only one connection is established to this instance as the MOVIFIT® unit can only be controlled by one single EtherNet/IP™ master.

| Attribute | Access | Name | Data type     | Default value hex | Description     |
|-----------|--------|------|---------------|-------------------|-----------------|
| 3         | Get    | Data | Array of BYTE | –                 | OUTPUT assembly |

#### Instance 121 – "Heartbeat"

The EtherNet/IP™ master establishes an "Input Only Connection" to this instance. No process output data is sent with this type of connection. It is used only to read process input data.

| Attribute | Access | Name | Data type     | Default value hex | Description                    |
|-----------|--------|------|---------------|-------------------|--------------------------------|
| 3         | Get    | Data | Array of BYTE | –                 | OUTPUT assembly<br>Data Size 0 |

#### Instance 170 – PI data range

This instance accesses the process input data of the MOVIFIT® unit. Several multi cast connections or a point-to-point connection can be established to this instance.

| Attribute | Access | Name | Data type     | Default value hex | Description    |
|-----------|--------|------|---------------|-------------------|----------------|
| 3         | Get    | Data | Array of BYTE | –                 | INPUT assembly |

## INFORMATION



The designations "INPUT assembly" and "OUTPUT assembly" refer to the processes as seen from the network's point of view. An "INPUT assembly" produces data on the network, "OUTPUT assembly" uses data from the network.

#### Supported services

The following table shows the services supported by the assembly object:

| Service Code hex | Service Name         | Class | Instance 160 | Instance 121 | Instance 170 |
|------------------|----------------------|-------|--------------|--------------|--------------|
| 0E               | Get_Attribute_Single | X     | X            | –            | X            |

### 7.4.4 Register object

- Accesses the SEW parameter index.
- Class code: 07<sub>hex</sub>

#### Class

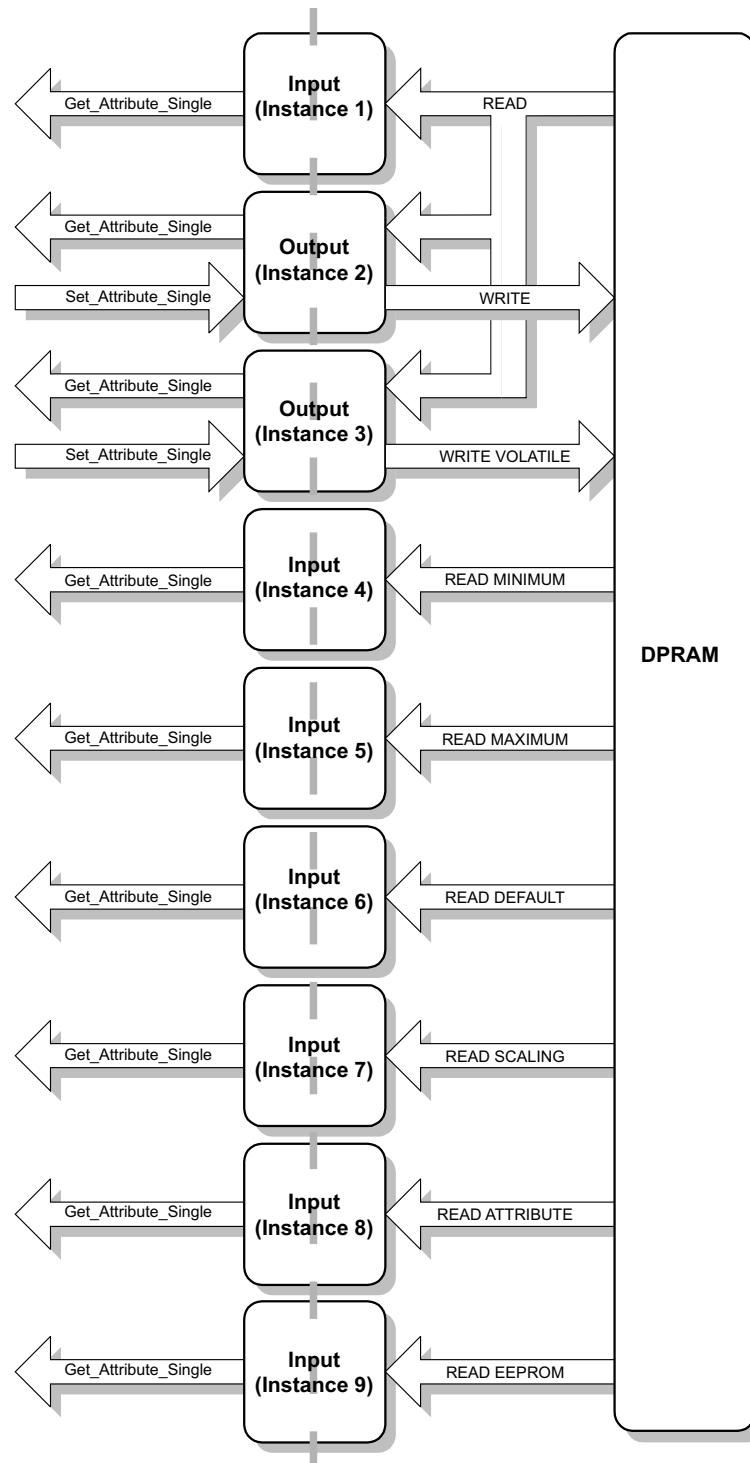
| Attribute | Access | Name         | Data type | Default value hex | Description      |
|-----------|--------|--------------|-----------|-------------------|------------------|
| 2         | Get    | Max Instance | UINT      | 0009              | Maximum instance |

The MOVILINK® services are mapped in the 9 instances of the register object. The services "Get\_Attribute\_Single" and "Set\_Attribute\_Single" are used for access.

The register object is specified so that INPUT objects can only be read, whereas OUTPUT objects can be read and written. This is why you may only access the parameter channel as follows:

| Instance | INPUT/OUTPUT | Resulting MOVILINK® service with |                          |
|----------|--------------|----------------------------------|--------------------------|
|          |              | Get_Attribute_Single             | Set_Attribute_Single     |
| 1        | INPUT        | READ parameter                   | Invalid                  |
| 2        | OUTPUT       | READ                             | WRITE parameter          |
| 3        | OUTPUT       | READ                             | WRITE VOLATILE parameter |
| 4        | INPUT        | READ MINIMUM                     | Invalid                  |
| 5        | INPUT        | READ MAXIMUM                     | Invalid                  |
| 6        | INPUT        | READ DEFAULT                     | Invalid                  |
| 7        | INPUT        | READ SCALING                     | Invalid                  |
| 8        | INPUT        | READ ATTRIBUTE                   | Invalid                  |
| 9        | INPUT        | READ EEPROM                      | Invalid                  |

Description of the parameter channel:



879804555

EtherNet/IP™

Fieldbus profile from SEW-EURODRIVE

### Instance 1 – 9

The following table provides an overview of instances 1 – 9 of the register object:

| Attribute | Access  | Name      | Data type     | Default value hex | Description                                                                           |
|-----------|---------|-----------|---------------|-------------------|---------------------------------------------------------------------------------------|
| 1         | Get     | Bad Flag  | BOOLEAN       | 00                | <ul style="list-style-type: none"> <li>Value 0: good</li> <li>Value 1: bad</li> </ul> |
| 2         | Get     | Direction | BOOLEAN       | 00<br>01          | Input register<br>Output register                                                     |
| 3         | Get     | Size      | UINT          | 0060              | Data length in bits (96 bits = 12 bytes)                                              |
| 4         | Get/Set | Data      | ARRAY of BITS | –                 | Data in format of the SEW parameter channel                                           |

The attributes have the following functions:

- Attribute 1 indicates whether an error occurred during the previous access to the data field.
- Attribute 2 indicates the direction of the instance.
- Attribute 3 indicates the data length in bits.
- Attribute 4 indicates the parameter data. When accessing attribute 4, the SEW parameter channel must be attached to the service telegram.

The SEW parameter channel has the following structure:

| Name         | Data type | Description                                                                                                                                                                    |
|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Index        | UINT      | SEW device index                                                                                                                                                               |
| Data         | UDINT     | Data (32 bit)                                                                                                                                                                  |
| Subindex     | BYTE      | SEW device subindex                                                                                                                                                            |
| Reserved     | BYTE      | Reserved (must be "0")                                                                                                                                                         |
| Subaddress 1 | BYTE      | Various subchannels and subaddresses apply depending on the implemented option or the lower-level bus system of the MOVIFIT® function level "Technology" (see following table) |
| Subchannel 1 | BYTE      |                                                                                                                                                                                |
| Subaddress 2 | BYTE      | Reserved (must be "0")                                                                                                                                                         |
| Subchannel 2 | BYTE      | Reserved (must be "0")                                                                                                                                                         |

There are the following subchannels and subaddresses:

| Subchannel 1 | Subaddress 1 | Option/interface                            |
|--------------|--------------|---------------------------------------------|
| 0            | 0            | MOVIFIT® controller with fieldbus interface |
| 1            | 16 – 21      | MOVIFIT® slaves with external CAN bus       |
| 2            | 1            | MOVIFIT® SC/FC power section                |
| 3            | 2            | MOVIMOT® 1 (only for MOVIFIT® MC)           |
| 4            | 3            | MOVIMOT® 2 (only for MOVIFIT® MC)           |
| 5            | 4            | MOVIMOT® 3 (only for MOVIFIT® MC)           |

### Supported services

The following table shows the services supported by the register object:

| Service Code hex | Service Name         | Instance |
|------------------|----------------------|----------|
| 0x0E             | Get_Attribute_Single | X        |
| 0x10             | Set_Attribute_Single | X        |

### 7.4.5 Parameter object

- Also accesses the SEW parameter index.
- Class code: 0F<sub>hex</sub>

## INFORMATION



Access to an SEW parameter index via the parameter object is complicated and prone to errors.

Therefore, only use the parameter object in exceptional cases if the EtherNet/IP™ master does not support parameterization via the mechanisms of the register object.

### Class

| Attribute | Access | Name                             | Data type | Default value hex | Description                                                                                                                                                 |
|-----------|--------|----------------------------------|-----------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Get    | Revision                         | UINT      | 0001              | Revision 1                                                                                                                                                  |
| 2         | Get    | Max Instance                     | UINT      | 0005              | Maximum instance                                                                                                                                            |
| 8         | Get    | Parameter Class Descriptor       | UINT      | 0009              | <ul style="list-style-type: none"> <li>• Bit 0: Supports parameter instances</li> <li>• Bit 3: Saves parameter permanently (non-volatile memory)</li> </ul> |
| 9         | Get    | Configuration Assembly Interface | UINT      | 0000              | "Configuration Assembly" not supported.                                                                                                                     |

The instances of the parameter object should only be used to access SEW parameters when the EtherNet/IP™ master in use does not support the process of attaching own data to the services "Get\_Attribute\_Single" and "Set\_Attribute\_Single".

Addressing a parameter index with the parameter object takes place in several steps:

1. Set the address of the required parameter in the instances 1 – 4.
2. Instance 5 is used to access the parameter that is addressed in instances 1 – 4.

### Instance 1 – SEW parameter index

The following table provides an overview of instance 1 of the parameter object:

| Attribute | Access | Name            | Data type    | Default value hex | Description            |
|-----------|--------|-----------------|--------------|-------------------|------------------------|
| 1         | Set    | Parameter value | UINT         | 207A              | Index of the parameter |
| 2         | Get    | Link Path Size  | USINT        | 00                | No link is specified   |
| 3         | Get    | Link Path       | Packed EPATH | 00                | Not used               |
| 4         | Get    | Descriptor      | WORD         | 0000              | Read/write parameter   |
| 5         | Get    | Data type       | EPATH        | 00C7              | UINT                   |
| 6         | Get    | Data Size       | USINT        | 02                | Data length in bytes   |

### Instance 2 – SEW subindex

The following table provides an overview of instance 2 of the parameter object:

| Attribute | Access | Name            | Data type    | Default value hex | Description                     |
|-----------|--------|-----------------|--------------|-------------------|---------------------------------|
| 1         | Set    | Parameter value | UINT         | 0000              | Low byte contains the subindex. |
| 2         | Get    | Link Path Size  | USINT        | 00                | No link is specified            |
| 3         | Get    | Link Path       | Packed EPATH | 00                | Not used                        |
| 4         | Get    | Descriptor      | WORD         | 0000              | Read/write parameter            |
| 5         | Get    | Data type       | EPATH        | 00C7              | UINT                            |
| 6         | Get    | Data Size       | USINT        | 02                | Data length in bytes            |

### Instance 3 – SEW subparameter 1

The following table provides an overview of instance 3 of the parameter object:

| Attribute | Access | Name            | Data type    | Default value hex | Description                                                                                                                   |
|-----------|--------|-----------------|--------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1         | Set    | Parameter value | UINT         | 0000              | <ul style="list-style-type: none"> <li>Low byte: Contains subaddress 1.</li> <li>High byte: Contains subchannel 1.</li> </ul> |
| 2         | Get    | Link Path Size  | USINT        | 00                | No link is specified                                                                                                          |
| 3         | Get    | Link Path       | Packed EPATH | 00                | Not used                                                                                                                      |
| 4         | Get    | Descriptor      | WORD         | 0000              | Read/write parameter                                                                                                          |
| 5         | Get    | Data type       | EPATH        | 00C7              | UINT                                                                                                                          |
| 6         | Get    | Data Size       | USINT        | 02                | Data length in bytes                                                                                                          |

### Instance 4 – SEW subparameter 2

The following table provides an overview of instance 4 of the parameter object:

| Attribute | Access | Name            | Data type    | Default value hex | Description                                                                                                                   |
|-----------|--------|-----------------|--------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1         | Set    | Parameter Value | UINT         | 0000              | <ul style="list-style-type: none"> <li>Low byte: Contains subaddress 2.</li> <li>High byte: Contains subchannel 2.</li> </ul> |
| 2         | Get    | Link Path Size  | USINT        | 00                | No link is specified                                                                                                          |
| 3         | Get    | Link Path       | Packed EPATH | 00                | Not used                                                                                                                      |
| 4         | Get    | Descriptor      | WORD         | 0000              | Read/write parameter                                                                                                          |
| 5         | Get    | Data type       | EPATH        | 00C7              | UINT                                                                                                                          |
| 6         | Get    | Data Size       | USINT        | 02                | Data length in bytes                                                                                                          |



**Entity 5 – SEW read/write**

The following table provides an overview of instance 5 of the parameter object:

| Attribute | Access | Name            | Data type    | Default value hex | Description                                                                                                                                                                                                                                           |
|-----------|--------|-----------------|--------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Set    | Parameter Value | UDINT        |                   | <ul style="list-style-type: none"> <li>Set service: Performs write access to the parameter that is addressed in the instances 1 – 4.</li> <li>Get service: Performs read access to the parameter that is addressed in the instances 1 – 4.</li> </ul> |
| 2         | Get    | Link Path Size  | USINT        | 00                | No link is specified                                                                                                                                                                                                                                  |
| 3         | Get    | Link Path       | Packed EPATH | 00                | Not used                                                                                                                                                                                                                                              |
| 4         | Get    | Descriptor      | WORD         | 0000              | Read/write parameter                                                                                                                                                                                                                                  |
| 5         | Get    | Data type       | EPATH        | 00C8              | UDINT                                                                                                                                                                                                                                                 |
| 6         | Get    | Data Size       | USINT        | 04                | Data length in bytes                                                                                                                                                                                                                                  |

**Supported services**

The following table shows the services supported by the parameter object:

| Service Code hex | Service Name         | class | Instance |
|------------------|----------------------|-------|----------|
| 0E               | Get_Attribute_Single | X     | X        |
| 10               | Set_Attribute_Single | –     | X        |

### 7.4.6 Vardata object

- This manufacturer-specific object allows for engineering with software tools from SEW-EURODRIVE.
- Class code: 64<sub>hex</sub>

#### Class

None of the class attributes are supported.

#### Instance 1

The following table provides an overview of instance 1 of the Vardata object:

| Attribute | Access | Name | Data type     | Default value hex | Description                  |
|-----------|--------|------|---------------|-------------------|------------------------------|
| 1         | Get    | Data | ARRAY OF SINT | –                 | –                            |
| 2         | Get    | Size | UINT          | 00F2              | Maximum data length in bytes |

#### Supported services

The following table shows the services supported by the Vardata object:

| Service Code hex | Service Name         | Instance attribute 1 | Instance attribute 2 |
|------------------|----------------------|----------------------|----------------------|
| 0E               | Get_Attribute_Single | X                    | X                    |
| 32               | Vardata (custom)     | X                    | –                    |

The standardized service "Get\_Attribute\_Single" (Service Code 0x0E) delivers a data stream with the maximum data length (attribute 2) when instance attribute 1 is accessed. The data content is filled with zeros. If a data stream is added to the request telegram ("Service Type Custom"), this data is returned in a mirrored form (Vardata test mode).

The Vardata service (service code 0x32) is manufacturer-specific. Request and response of this service have the same telegram structure. The telegram contains routing information, the data length of the Vardata user data telegram and the actual Vardata layer -7 telegram. The data length of the Vardata layer -7 telegram is variable.

The following table shows the complete telegram structure.

| Name          | Data type     |
|---------------|---------------|
| Subaddress 1  | BYTE          |
| Subchannel 1  | BYTE          |
| Subaddress 2  | BYTE          |
| Subchannel 2  | BYTE          |
| Data Len Low  | BYTE          |
| Data Len High | BYTE          |
| Reserved      | BYTE          |
| Reserved      | BYTE          |
| FC            | BYTE          |
| Vardata       | Array of BYTE |

### 7.4.7 TCP/IP interface object

- Allows for configuration of the IP parameters via EtherNet/IP™.
- Class code: F5<sub>hex</sub>

#### Class

| Attribute | Access | Name                | Data type | Default value hex | Description                          |
|-----------|--------|---------------------|-----------|-------------------|--------------------------------------|
| 1         | Get    | Revision            | UINT      | 0001              | Revision 1                           |
| 2         | Get    | Max Instance        | UINT      | 0001              | Maximum instance                     |
| 3         | Get    | Number of Instances | UINT      | 0001              | The device has one TCP/IP interface. |

#### Instance 1

The following table provides an overview of instance 1 of the TCP/IP interface object:

| Attribute | Access | Name                     | Data type    | Default value hex | Description                                                                                                                                                                                          |
|-----------|--------|--------------------------|--------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Get    | Status                   | DWORD        | 00000001          | Valid configuration                                                                                                                                                                                  |
| 2         | Get    | Configuration Capability | DWORD        | 00000014          | The interface configuration attribute (5) is writable. The DHCP can be used for configuration.                                                                                                       |
| 3         | Set    | Configuration Control    | DWORD        | 00000002          | <ul style="list-style-type: none"> <li>• Value 0: The device uses IP parameters saved during boot-up.</li> <li>• Value 1: The device awaits its IP configuration via DHCP during boot-up.</li> </ul> |
| 4         | Get    | Physical Link Object     | STRUCT of    | –                 | Reference to the EtherNet link object (class code 0xF6) as sublayer.                                                                                                                                 |
|           |        | Path Size                | UINT         | 0002              |                                                                                                                                                                                                      |
|           |        | Path                     | Padded EPATH | 20 F6 24 01       |                                                                                                                                                                                                      |
| 5         | Set    | Interface Configuration  | STRUCT of    | –                 | –                                                                                                                                                                                                    |
|           |        | IP Address               | UDINT        | –                 | Current IP address                                                                                                                                                                                   |
|           |        | Network Mask             | UDINT        | –                 | Current subnetwork mask                                                                                                                                                                              |
|           |        | Gateway Address          | UDINT        | –                 | Currently set standard gateway                                                                                                                                                                       |
|           |        | Name Server              | UDINT        | 00000000          | DNS is not supported.                                                                                                                                                                                |
|           |        | Name Server 2            | UDINT        | 00000000          | DNS is not supported.                                                                                                                                                                                |
|           |        | Domain Name              | STRING       | sew.de            | –                                                                                                                                                                                                    |
| 6         | Get    | Host Name                | STRING       | –                 | Not used                                                                                                                                                                                             |

#### Supported services

The following table shows the services supported by the TCP/IP interface object:

| Service Code hex | Service Name         | class | Instance |
|------------------|----------------------|-------|----------|
| 01               | Get_Attributes_All   | X     | –        |
| 0E               | Get_Attribute_Single | X     | X        |
| 10               | Set_Attribute_Single | –     | X        |

### 7.4.8 EtherNet link object

- Contains information on the Ethernet communication interface.
- Class code: F6<sub>hex</sub>

#### Class

| Attribute | Access | Name                | Data type | Default value hex | Description                          |
|-----------|--------|---------------------|-----------|-------------------|--------------------------------------|
| 1         | Get    | Revision            | UINT      | 0001              | Revision 1                           |
| 2         | Get    | Max Instance        | UINT      | 0001              | Maximum instance                     |
| 3         | Get    | Number of Instances | UINT      | 0001              | The device has one TCP/IP interface. |

#### Instance 1 – Ethernet connection X30/X11

The following table provides an overview via instance 1 of the identity object:

| Attribute | Access | Name             | Data type          | Default value hex    | Description                                                                                                                                                                                                                                                                                                   |
|-----------|--------|------------------|--------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Get    | Interface Speed  | UDINT              | 00000064             | Transmission speed in MBit/s<br>Standard value = 100                                                                                                                                                                                                                                                          |
| 2         | Get    | Interface Flags  | DWORD              | –                    | <ul style="list-style-type: none"> <li>• Bit 0: Displays the active link.</li> <li>• Bit 1: Displays full duplex mode.</li> <li>• Bit 2 – 4: Signals negotiation state.</li> <li>• Bit 5: Displays whether the manual setting has to be reset.</li> <li>• Bit 6: Indicates a local hardware error.</li> </ul> |
| 3         | Get    | Physical Address | ARRAY of 6 US-INTs | 00 0F 69<br>xx xx xx | MAC ID<br>SEW MAC OUI: 00 0F 69                                                                                                                                                                                                                                                                               |

#### Instance 2 – Ethernet connection X31/X12

The following table provides an overview via instance 2 of the identity object:

| Attribute | Access | Name             | Data type          | Default value hex    | Description                                                                                                                                                                                                                                                                                                   |
|-----------|--------|------------------|--------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Get    | Interface Speed  | UDINT              | 00000064             | Transmission speed in MBit/s<br>Standard value = 100                                                                                                                                                                                                                                                          |
| 2         | Get    | Interface Flags  | DWORD              | –                    | <ul style="list-style-type: none"> <li>• Bit 0: Displays the active link.</li> <li>• Bit 1: Displays full duplex mode.</li> <li>• Bit 2 – 4: Signals negotiation state.</li> <li>• Bit 5: Displays whether the manual setting has to be reset.</li> <li>• Bit 6: Indicates a local hardware error.</li> </ul> |
| 3         | Get    | Physical Address | ARRAY of 6 US-INTs | 00 0F 69<br>xx xx xx | MAC ID<br>SEW MAC OUI: 00 0F 69                                                                                                                                                                                                                                                                               |

## Supported services

The following table shows the services supported by the Ethernet link object:

| Service Code hex | Service Name         | Instance attribute 1 | Instance attribute 2 |
|------------------|----------------------|----------------------|----------------------|
| 01               | Get_Attributes_All   | X                    | –                    |
| 0E               | Get_Attribute_Single | X                    | X                    |

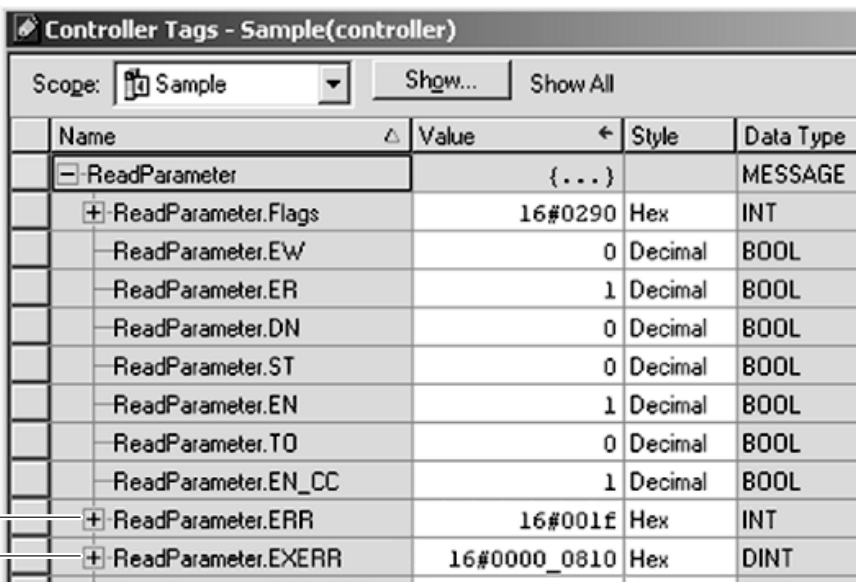
### 7.4.9 Return codes for parameterization via "explicit messages"

If a parameter request via "explicit messages" fails, you can determine the cause via an error code.

An error is generated as follows:

- By EtherNet/IP™ master
- By EtherNet/IP™ slave
- Due to timeout

The general error code (ERR) and the additional code (EXERR) can be read out from the status registers of the message tags:



| Name                    | Value        | Style   | Data Type |
|-------------------------|--------------|---------|-----------|
| ReadParameter           | {...}        |         | MESSAGE   |
| ReadParameter.Flags     | 16#0290      | Hex     | INT       |
| ReadParameter.EW        | 0            | Decimal | BOOL      |
| ReadParameter.ER        | 1            | Decimal | BOOL      |
| ReadParameter.DN        | 0            | Decimal | BOOL      |
| ReadParameter.ST        | 0            | Decimal | BOOL      |
| ReadParameter.EN        | 1            | Decimal | BOOL      |
| ReadParameter.TO        | 0            | Decimal | BOOL      |
| ReadParameter.EN_CC     | 1            | Decimal | BOOL      |
| [1] ReadParameter.ERR   | 16#001f      | Hex     | INT       |
| [2] ReadParameter.EXERR | 16#0000_0810 | Hex     | DINT      |

14310226443

[1] General Error Code (ERR): Value 16#001f

[2] Additional Code (EXERR): Value 16#0000\_0810

### Return code from EtherNet/IP™ master

EtherNet/IP™-specific return codes are returned in the error telegram if the data format is not maintained during the transfer or if a service is performed that has not been implemented. The coding of the return code is described in chapter "General error codes" (→ 91). For further information about the return codes, refer to the EtherNet/IP™ specification.

The "General Error Code" of a manufacturer-specific return code is 1F<sub>hex</sub>.

## Return code from EtherNet/IP™ slave

The return codes that are returned from the EtherNet/IP™ slave or lower-level devices due to faulty parameterization are described in the following chapter: "MOVILINK®-specific return codes" (→ 91).

In conjunction with EtherNet/IP™, the return codes are sent back in the following format:

| Byte offset | Function                              | Example: Parameter response telegram                 |
|-------------|---------------------------------------|------------------------------------------------------|
| 0           | General Error Codes                   | 1F <sub>hex</sub><br>Vendor-specific                 |
| 1           | Additional code<br>Length (words)     | 01 <sub>hex</sub><br>Only low word (word 1)          |
| 2           | Additional code<br>Word 1 (low byte)  | 10 <sub>hex</sub><br>MOVILINK® additional error code |
| 3           | Additional code<br>Word 1 (high byte) | 08 <sub>hex</sub><br>MOVILINK® error class           |

The return code 16#0000\_0810 (Example from chapter "Return codes for parameterization via "explicit messages"" (→ 89)) has the following meaning:

- The "MOVILINK® Error Class" 08 in high byte of "Additional Codes" stands for "General Error".
- The "MOVILINK® Additional Error Class" 10 in low byte of "Additional Codes" stands for "Invalid Index".

The return thus indicates that a non-existing device index was accessed.

## Timeout response of "explicit messages"

The timeout status is triggered by the EtherNet/IP™ slave. The EtherNet/IP™ master sets the timeout interval while establishing a connection. The EtherNet/IP™ specification refers to an "Expected packet rate" rather than a timeout interval in this case. The "Expected Packet Rate" is calculated from the timeout interval as follows:

$$t_{\text{Timeout\_ExpliciteMessages}} = 4 \times t_{\text{Expected\_Packet\_Rate\_ExpliciteMessages}}$$

The "Expected Packet Rate" sets the "Forward Open Telegram" when the connection is established.

If a timeout occurs for the "explicit messages", the connection type is dropped automatically in the default setting of the EtherNet/IP™. The connection type must be re-established to communicate with "explicit messages" again. The timeout is **not** forwarded to the IEC program.

## General error codes

| General Error Code hex | Designation              | Description                                                                                                                                                       |
|------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00                     | Success                  | Successful                                                                                                                                                        |
| 01                     | Connection failure       | A connection-specific service has failed.                                                                                                                         |
| 02                     | Resource unavailable     | The source required for performing the service is unavailable.                                                                                                    |
| 03                     | –                        | Reserved                                                                                                                                                          |
| 04                     | Path segment error       | The processing node was unable to interpret the "Path Segment Identifier" or the segment syntax.                                                                  |
| 05                     | Path destination unknown | The "Path" refers to an object class, object instance or a structural element that is not supported by the processing node.                                       |
| 06 – 07                | –                        | Reserved                                                                                                                                                          |
| 08                     | Service not supported    | The service is not supported for the selected class/instance.                                                                                                     |
| 09                     | Invalid attribute value  | Invalid attribute data have been sent.                                                                                                                            |
| 0A – 0B                | –                        | –                                                                                                                                                                 |
| 0C                     | Object state conflict    | The selected object cannot perform the service in its current status.                                                                                             |
| 0D                     | –                        | Reserved                                                                                                                                                          |
| 0E                     | Attribute not settable   | It is not possible to access the selected object for writing.                                                                                                     |
| 10                     | Device state conflict    | The current status of the device makes it impossible to perform the required service.                                                                             |
| 11 – 12                | –                        | Reserved                                                                                                                                                          |
| 13                     | Not enough data          | The length of the transferred data is too short for the service to be performed.                                                                                  |
| 14                     | Attribute not supported  | The selected attribute is not supported.                                                                                                                          |
| 15                     | Too much data            | The length of the transferred data is too long for the service to be performed.                                                                                   |
| 16                     | Object does not exist    | The selected object is not implemented in the device.                                                                                                             |
| 17 – 1D                | –                        | Reserved                                                                                                                                                          |
| 1E                     | Embedded Service Error   | Internal processing error                                                                                                                                         |
| 1F                     | Vendor specific error    | Manufacturer-specific error                                                                                                                                       |
| 20                     | Invalid parameter        | Invalid parameter. This error message is used when a parameter does not satisfy the requirements of the specification and/or the requirements of the application. |
| 21-FF                  | –                        | Reserved                                                                                                                                                          |

## MOVILINK®-specific return codes

The MOVILINK®-specific return codes are structured according to EN 50170. Refer to chapter Return codes for parameterization for a detailed description of the return codes.

## 7.5 Technical data of the EtherNet/IP™ interface

| EtherNet/IP™                  | MOVIFIT® function level "Technology"                                                                                                                                                                      |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic baud rate detection | 10 MBd/100 MBd                                                                                                                                                                                            |
| Connection technology         | M12, RJ45 (push-pull) and RJ45 plug connector (in ABOX)                                                                                                                                                   |
| Integrated switch             | Supports auto-crossing, auto-negotiation                                                                                                                                                                  |
| Maximum line length           | 100 m according to IEEE 802.3                                                                                                                                                                             |
| Addressing                    | 4 byte IP address or MAC-ID (00-0F-69-xx-xx-xx)<br>Can be configured using the DHCP server or MOVITOOLS® MotionStudio<br>Default value of the address (depending on S11 DIP switch setting): 192.168.10.4 |
| Vendor ID                     | 013 B <sub>hex</sub>                                                                                                                                                                                      |
| Name of EDS files             | SEW_MOVIFIT_TECH_ENIP.eds                                                                                                                                                                                 |
| Name of icon files            | SEW_MOVIFIT_TECH_ENIP.ico                                                                                                                                                                                 |



## 8 Configuration and startup of Modbus/TCP

This chapter provides information on the configuration of the Modbus/TCP master and startup of the MOVIFIT® function level "Technology" for fieldbus operation.

Requirements for correct configuration and startup are:

- Correct connection
- Correct setting of the IP address parameters of the MOVIFIT® unit (see chapter "Installation notes" (→ 24))

Configuration is explained with examples. The examples are configurations carried out with the programming software PL7 PRO by Schneider Electric.

### 8.1 Device description file for Modbus/TCP

There are no specific device description files for Modbus/TCP.

### 8.2 Configuration of the Modbus/TCP master

The following example describes configuration and programming of the Modbus/TCP master (scanner) in a TSX Premium P57203 control by Schneider Electric with PL7 PRO. An ETY4103 is used as the Ethernet component.

Please note:

- The information and illustrations in the example are based on the English version of the PL7 PRO software.
- Enter values in PL7 PRO using the keypad.
- For fieldbus master, use only those Ethernet components by Schneider Electric that support the "IO Scanning" function of Modbus/TCP communication. You cannot access drives from SEW-EURODRIVE via the "Peer Cop" function. However, fieldbus masters that only support "Peer Cop" can access the drives via the PLC program using read and write commands.

Configuration of the Modbus/TCP master takes several steps:

1. "Configuring hardware (control structure)" (→ 94)
2. "Setting Ethernet component" (→ 95)
3. "Addressing drive via the "IO Scanning" function" (→ 96)

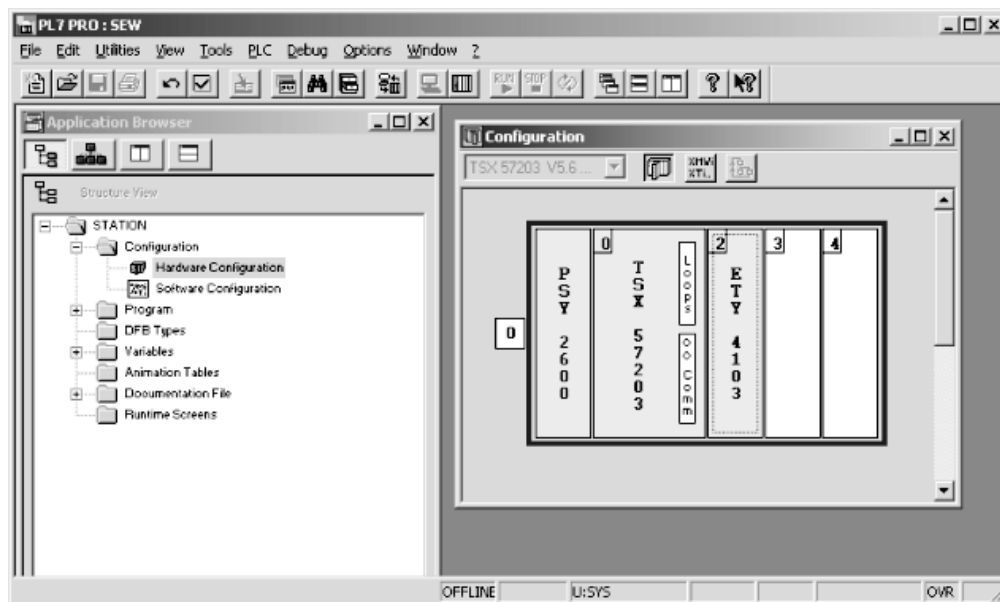
# 8 Configuration and startup of Modbus/TCP

## Configuration of the Modbus/TCP master

### 8.2.1 Configuring hardware (control structure)

Proceed as follows:

1. Start PL7 PRO and enter the control type.
2. Enter the hardware configuration of the controller via "STATION" > "Configuration" > "Hardware Configuration".



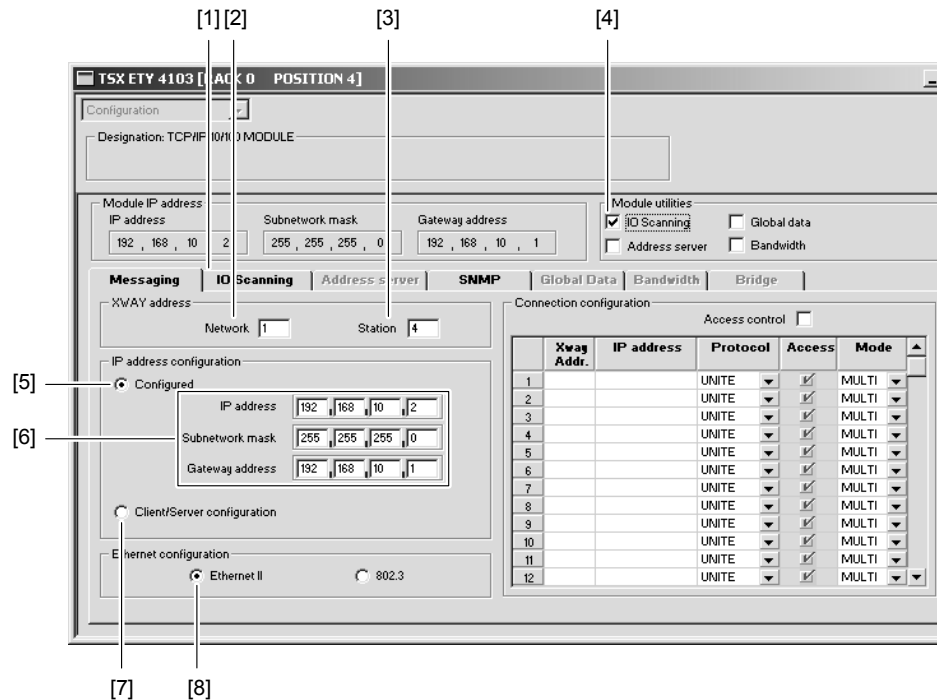
9007200885717899

21361797/EN – 12/2015

### 8.2.2 Setting Ethernet component

Proceed as follows:

1. Open the hardware configurator in PL7 PRO.
2. Double-click on the Ethernet component (in this case: ETY4103).  
⇒ The configuration window is displayed.



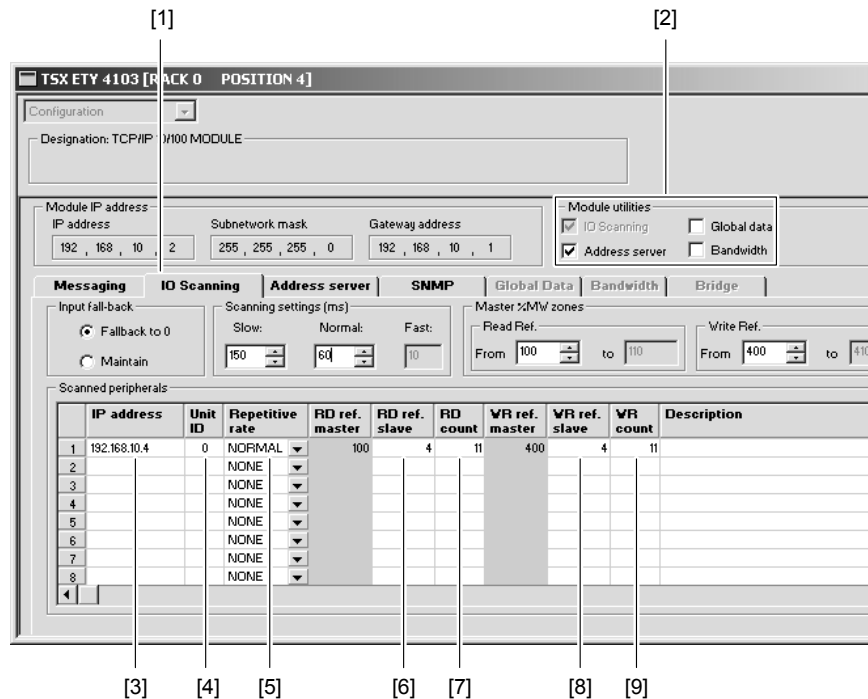
9007200084294155

3. If you have a non-expandable rack, enter the value "1" in the edit box [2].
4. Enter the number of the slot that the Ethernet component is plugged into (in this case: 4) in the edit box [3].  
⇒ In this example, the XWAY address is 1.4.
5. Activate the radio button [5].
6. Enter the IP address and the network parameters into the edit boxes [6].
7. If the controller receives the address parameters via DHCP, activate the radio button [7].
8. Activate the radio button [8].
9. Activate the check box [4].

### 8.2.3 Addressing drive via the "IO Scanning" function

Proceed as follows:

1. Open the Ethernet component hardware configurator of PL7 PRO.
2. Open the tab [1]. In this tab, select the Modbus/TCP nodes with which cyclical data should be exchanged.



9007200084992139

3. In the section [2], enter the control memory areas that are to be used to exchange cyclical data with the Modbus/TCP nodes. You will use the memory addresses later in your PLC program.
4. Enter the IP address of the drive from SEW-EURODRIVE into the edit box [3].
5. Enter the value "0" in the edit box [4].
6. Select the cycle time in which the nodes are addressed in the choice box [5].
7. As the cyclical process data are located after offset 4, enter the value "4" in the edit boxes [6] and [8].
8. In the edit boxes [7] and [9] enter the number of words to be exchanged. The values must be the same in both fields.
  - ⇒ You can set 1 – 32 words for the MOVIFIT® unit.
9. To confirm the rack configuration and the global configuration, click the [Confirm] button.
  - ⇒ If you restart the program after the settings are transferred, the "NS" (**N**etwork **S**tatus) LED of the MOVIFIT® unit switches to green (see chapter "Bus-specific LEDs for EtherNet/IP™ and Modbus/TCP" (→ 43)).

### 8.3 Requirements to the MOVIFIT® unit for fieldbus operation

For fieldbus operation of a MOVIFIT® unit, the following devices must be started up:

- Integrated power section (with MOVIFIT® SC/FC)
- Connected MOVIMOT® inverter (with MOVIFIT® MC)
- Connected MOVIFIT® slaves

In addition, the MOVIFIT® control board requires an IEC program.

As standard, MOVIFIT® function level "Technology" is delivered with the "Transparent mode" IEC program. Other IEC programs can be loaded on the MOVIFIT® control board according to the required functionality.

The required number of process data words is defined in the IEC program (see chapter "Configuration in transparent mode" (→ 208)). The "SF/USR" LED indicates whether an IEC program has been loaded or started (see chapter "SF/USR LED" (→ 38)). For further information on the currently loaded IEC program, refer to the parameter tree in the MOVITOOLS® MotionStudio engineering software under "Display values" > "Unit data".

Start the PLC Editor via [Programming] in the context menu. Use the MOVI-PLC® Editor to create programs and load them to the MOVIFIT® unit.

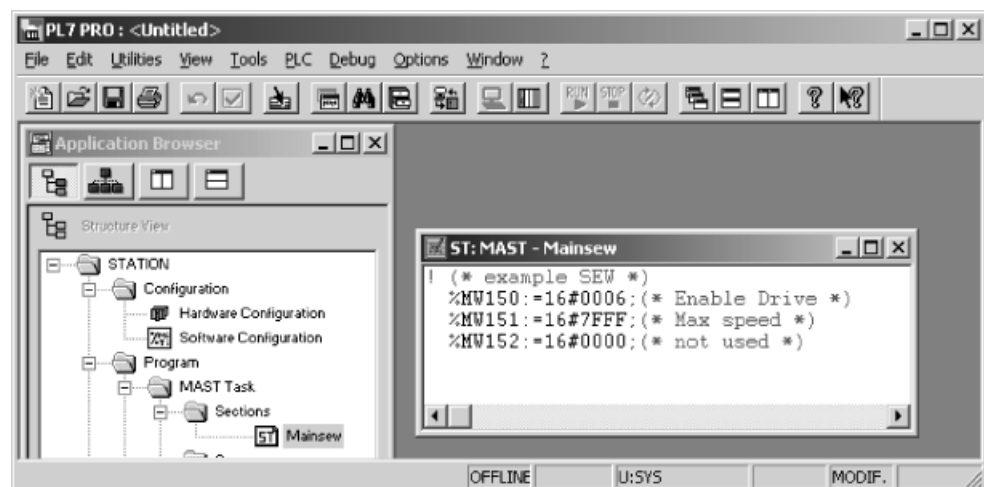
## 8.4 Project planning examples

### 8.4.1 Configuring process data exchange

The following example describes the configuration of the process data exchange between the Modbus/TCP master and the unit in PL7 PRO.

Proceed as follows:

1. Set the IP address in the device (see chapter "Setting the IP address parameters" (→ 28)).
2. In the Application Browser in PL7 PRO, add the device to the hardware configuration for the "IO Scanning" function (see chapter "Configuration of the Modbus/TCP master" (→ 93)).
3. Create a new section via "STATION" > "Program" > "Mast Task" > "Sections".  
⇒ In the example, the setpoints for the drive start at MW150.



18014400140553099

4. Save the project and transfer it to the controller.
5. Switch to RUN mode of the controller.
  - ⇒ Process data exchange via Modbus/TCP is active. The actual values of the unit can be read and setpoints can be written.
6. Check if the process data correspond to the values that are displayed in the parameter tree or the diagnostics plug-in for the active IEC program of the MOVITOOLS® MotionStudio engineering software.

#### 8.4.2 Data exchange via Modbus/TCP

As there are many different master systems and software solutions available for Modbus/TCP for standard PCs, there is not "one reference controller" the examples are based on. This chapter gives detailed examples regarding the telegram structure.

The telegram structure from the examples can be used for troubleshooting in case of errors in the telegram structure in your own applications. There are simple tools for recording telegrams via the Ethernet network, e.g. Wireshark, Packetizer etc. These freeware tools are available on the Internet.

Tracing all Ethernet telegrams in a network is only possible with a tap, hub or a switch with a port mirror function. Telegrams that are sent from and to the recording PC can always be written.

The following figure provides an example of how setpoints are written (FC16) to the Modbus/TCP slave with IP address 10.3.71.163. The 5 process data words are located from offset 4 (reference number) and are addressed via unit ID 255.

| Filter: tcp.port == 502                                           |                         | Expression...           |             |            |          |
|-------------------------------------------------------------------|-------------------------|-------------------------|-------------|------------|----------|
| No.                                                               | Time                    | Source                  | Destination | Protocol   | Info     |
| 9                                                                 | 4.315448                | 10.3.71.169             | 10.3.71.163 | Modbus/TCP | query    |
| 10                                                                | 4.316944                | 10.3.71.163             | 10.3.71.169 | Modbus/TCP | response |
| + Frame 9 (77 bytes on wire, 77 bytes captured)                   |                         |                         |             |            |          |
| + Ethernet II, Src: Intel_49:66:c3 (00:d0:b7:49:66:c3), Dst: Sew  |                         |                         |             |            |          |
| + Internet Protocol, Src: 10.3.71.169 (10.3.71.169), Dst: 10.3.71 |                         |                         |             |            |          |
| + Transmission Control Protocol, Src Port: 50014 (50014), Dst Po  |                         |                         |             |            |          |
| - Modbus/TCP                                                      |                         |                         |             |            |          |
| transaction identifier: 0                                         |                         |                         |             |            |          |
| protocol identifier: 0                                            |                         |                         |             |            |          |
| length: 17                                                        |                         |                         |             |            |          |
| unit identifier: 255                                              |                         |                         |             |            |          |
| - Modbus                                                          |                         |                         |             |            |          |
| function 16: write Multiple Registers                             |                         |                         |             |            |          |
| reference number: 4                                               |                         |                         |             |            |          |
| word count: 5                                                     |                         |                         |             |            |          |
| byte count: 10                                                    |                         |                         |             |            |          |
| Data                                                              |                         |                         |             |            |          |
| 0000                                                              | 00 0f 69 00 40 51 00 d0 | b7 49 66 c3 08 00 45 00 | ..i.@Q..    |            |          |
| 0010                                                              | 00 3f 02 04 40 00 80 06 | 55 63 0a 03 47 a9 0a 03 | .?.@...     |            |          |
| 0020                                                              | 47 a3 c3 5e 01 f6 f8 ac | eb 36 28 10 ae 32 50 18 | G..^....    |            |          |
| 0030                                                              | f6 b5 8d 07 00 00 00 00 | 00 00 00 11 ff 10 00 04 | .....       |            |          |
| 0040                                                              | 00 05 0a 00 00 00 00 00 | 00 00 00 00 00          | .....       |            |          |

9007200886408715

All the other examples merely describe the Modbus/TCP part of the telegram. The TCP/IP part of the telegram, as well as establishing and dropping a TCP/IP connection are not explained in detail.

### Process data exchange

The process data exchange is performed either via FC3 (read) and FC16 (write), or FC23 (read and write).

#### Process data exchange via FC16

The modbus/TCP part for writing of 5 process data words (setpoints) each via FC16 to port 502 of a Modbus/TCP slave is structured as follows:

| Byte | Value | Meaning                | Interpretation                                                                                | Help                                                                                                        |
|------|-------|------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 0    | 0x00  | Transaction identifier | –                                                                                             | For detailed description see Modbus/TCP specification and chapter "Modbus protocol (Modbus/TCP)" (→ ⓘ 104). |
| 1    |       |                        |                                                                                               |                                                                                                             |
| 2    | 0x00  | Protocol identifier    |                                                                                               |                                                                                                             |
| 3    |       |                        |                                                                                               |                                                                                                             |
| 4    | 0x00  | Length field           | Number of bytes after byte 5<br>Value: Number of PD × 2 + 7<br>(In this case: 5 × 2 + 7 = 17) |                                                                                                             |
| 5    | 0x11  |                        |                                                                                               |                                                                                                             |
| 6    | 0xFF  | Unit identifier        | Must be 0 or 255.                                                                             |                                                                                                             |
| 7    | 0x10  | Function code          | Service: FC16 (Write Register)                                                                |                                                                                                             |
| 8    | 0x00  | Write reference number | Offset where PD start.<br>Must always be 4.                                                   |                                                                                                             |
| 9    | 0x04  |                        |                                                                                               |                                                                                                             |
| 10   | 0x00  | Write word count       | Number of PD (1 – 32)<br>(In this case: 5)                                                    |                                                                                                             |
| 11   | 0x05  |                        |                                                                                               |                                                                                                             |
| 12   | 0x0A  | Write byte count       | Number of PD × 2 (2 – 64)<br>(In this case: 5 × 2 = 10)                                       |                                                                                                             |
| 13   | 0x00  | Data                   | Process output data word 1                                                                    | Data mapping and data definition see IEC program.                                                           |
| 14   | 0x11  |                        |                                                                                               |                                                                                                             |
| 15   | 0x22  | Data                   | Process output data word 2                                                                    |                                                                                                             |
| 16   | 0x33  |                        |                                                                                               |                                                                                                             |
| 17   | 0x44  | Data                   | Process output data word 3                                                                    |                                                                                                             |
| 18   | 0x55  |                        |                                                                                               |                                                                                                             |
| 19   | 0x66  | Data                   | Process output data word 4                                                                    |                                                                                                             |
| 20   | 0x77  |                        |                                                                                               |                                                                                                             |
| 21   | 0x88  | Data                   | Process output data word 5                                                                    |                                                                                                             |
| 22   | 0x99  |                        |                                                                                               |                                                                                                             |

Only bytes 0 – 11 are reset in port 502 of the Modbus/TCP slave. Apart from byte 5, all values remain unchanged. Byte 5 (low byte in length field) is corrected to value 6.

*Process data exchange via FC23*

During process data exchange via FC23, the Modbus/TCP part that is used to write and read 5 process data words (PD) each is structured as follows:

| Byte | Value | Meaning                | Interpretation                                                                                   | Help                                                                                                      |
|------|-------|------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 0    | 0x00  | Transaction identifier | —                                                                                                | For detailed description see Modbus/TCP specification and chapter "Modbus protocol (Modbus/TCP)" (→ 104). |
| 1    |       |                        |                                                                                                  |                                                                                                           |
| 2    |       |                        |                                                                                                  |                                                                                                           |
| 3    | 0x00  | Protocol identifier    |                                                                                                  |                                                                                                           |
| 4    | 0x00  | Length field           | Number of bytes after byte 5:<br>Value: Number of PD × 2 + 11<br>(In this case: 5 × 2 + 11 = 21) |                                                                                                           |
| 5    | 0x15  |                        |                                                                                                  |                                                                                                           |
| 6    | 0xFF  | Unit identifier        | Must be 0 or 255.                                                                                |                                                                                                           |
| 7    | 0x10  | Function code          | Service: FC23 (read and write register)                                                          |                                                                                                           |
| 8    | 0x00  | Read reference number  | Offset where PD start.<br>Must always be 4.                                                      |                                                                                                           |
| 9    | 0x04  |                        |                                                                                                  |                                                                                                           |
| 10   | 0x00  | Read word count        | Number of PD (1 – 32)<br>(In this case: 5)                                                       |                                                                                                           |
| 11   | 0x05  |                        |                                                                                                  |                                                                                                           |
| 12   | 0x00  | Write reference number | Offset where PD start:<br>Must always be 4.                                                      |                                                                                                           |
| 13   | 0x04  |                        |                                                                                                  |                                                                                                           |
| 14   | 0x00  | Write word count       | No. of PDs<br>See read word count<br>(In this case: 5)                                           |                                                                                                           |
| 15   | 0x05  |                        |                                                                                                  |                                                                                                           |
| 16   | 0x0A  | Write byte count       | Number of PD × 2 (2 – 64)<br>(In this case: 5 × 2 = 10)                                          |                                                                                                           |
| 17   | 0x00  | Data                   | Process output data word 1                                                                       | Data mapping and data definition see IEC program.                                                         |
| 18   | 0x11  |                        |                                                                                                  |                                                                                                           |
| 19   | 0x22  | Data                   | Process output data word 2                                                                       |                                                                                                           |
| 20   | 0x33  |                        |                                                                                                  |                                                                                                           |
| 21   | 0x44  | Data                   | Process output data word 3                                                                       |                                                                                                           |
| 22   | 0x55  |                        |                                                                                                  |                                                                                                           |
| 23   | 0x66  | Data                   | Process output data word 4                                                                       |                                                                                                           |
| 24   | 0x77  |                        |                                                                                                  |                                                                                                           |
| 25   | 0x88  | Data                   | Process output data word 5                                                                       |                                                                                                           |
| 26   | 0x99  |                        |                                                                                                  |                                                                                                           |



### Process data exchange response telegram

The following data bytes are returned in the response telegram of the Modbus/TCP slave:

| Byte | Value | Meaning                | Interpretation                                                                                | Help                                                                                                      |
|------|-------|------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 0    | 0x00  | Transaction identifier | —                                                                                             | For detailed description see Modbus/TCP specification and chapter "Modbus protocol (Modbus/TCP)" (→ 104). |
| 1    |       |                        |                                                                                               |                                                                                                           |
| 2    | 0x00  | Protocol identifier    |                                                                                               |                                                                                                           |
| 3    |       |                        |                                                                                               |                                                                                                           |
| 4    | 0x00  | Length field           | Number of bytes after byte 5<br>Value: Number of PD × 2 + 3<br>(In this case: 5 × 2 + 3 = 13) |                                                                                                           |
| 5    | 0x09  |                        |                                                                                               |                                                                                                           |
| 6    | 0xFF  | Unit identifier        | Must be 0 or 255.                                                                             |                                                                                                           |
| 7    | 0x17  | Function code          | Service: FC23 (read and write register)                                                       |                                                                                                           |
| 8    | 0x06  | Write byte count       | Number of PD × 2 (2 – 64)<br>(In this case: 5 × 2 = 10)                                       |                                                                                                           |
| 9    | 0x00  | Data                   | Process input data word 1                                                                     | Data mapping and data definition see IEC program.                                                         |
| 10   | 0xAA  |                        | Process input data word 2                                                                     |                                                                                                           |
| 11   | 0xBB  | Data                   | Process input data word 3                                                                     |                                                                                                           |
| 12   | 0xCC  |                        | Process input data word 4                                                                     |                                                                                                           |
| 13   | 0xDD  | Data                   | Process input data word 5                                                                     |                                                                                                           |
| 14   | 0xEE  |                        |                                                                                               |                                                                                                           |
| 15   | 0xFF  | Data                   |                                                                                               |                                                                                                           |
| 16   | 0x01  |                        |                                                                                               |                                                                                                           |
| 17   | 0x02  | Data                   |                                                                                               |                                                                                                           |
| 18   | 0x03  |                        |                                                                                               |                                                                                                           |

### Parameter access

Parameter channel via the MOVILINK® parameter channel is performed via FC23 (write and read). The job to the MOVILINK® service and retrieving the response is realized in one Modbus/TCP service.

#### Parameter access via FC23

The TCP/IP telegram is structured as follows for reading a parameter:

| Byte | Value | Meaning                              | Interpretation                                                                       | Help                                                                                                      |
|------|-------|--------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 0    | 0x00  | Transaction identifier               | —                                                                                    | For detailed description see Modbus/TCP specification and chapter "Modbus protocol (Modbus/TCP)" (→ 104). |
| 1    |       |                                      |                                                                                      |                                                                                                           |
| 2    | 0x00  | Protocol identifier                  |                                                                                      |                                                                                                           |
| 3    |       |                                      |                                                                                      |                                                                                                           |
| 4    | 0x00  | Length field                         | Number of bytes after byte 5:<br>Must be equal to 19 for MOVILINK®.                  |                                                                                                           |
| 5    |       |                                      |                                                                                      |                                                                                                           |
| 6    | 0xFF  | Unit identifier                      | Access to parameters of control board of MOVIFIT® unit itself <sup>1)</sup>          |                                                                                                           |
| 7    | 0x17  | Function code                        | Service = FC23 (read and write register)                                             |                                                                                                           |
| 8    | 0x02  | Read reference number                | Offset from where the MOVILINK® parameter channel is located:<br>Must always be 512. |                                                                                                           |
| 9    | 0x00  |                                      |                                                                                      |                                                                                                           |
| 10   | 0x00  | Read word count                      | Must always be 4 for the MOVILINK® parameter channel.                                |                                                                                                           |
| 11   | 0x04  |                                      |                                                                                      |                                                                                                           |
| 12   | 0x02  | Write reference number               | Offset from where the MOVILINK® parameter channel is located:<br>Must always be 512. |                                                                                                           |
| 13   | 0x00  |                                      |                                                                                      |                                                                                                           |
| 14   | 0x00  | Write word count                     | Must always be 4 for the MOVILINK® parameter channel.                                |                                                                                                           |
| 15   | 0x04  |                                      |                                                                                      |                                                                                                           |
| 16   | 0x08  | Write byte count                     | 8 byte MOVILINK®                                                                     |                                                                                                           |
| 17   | 0x31  | Data:<br>MOVILINK® parameter channel | Management bytes: 0x31 = read                                                        | Data mapping and definition see IEC program and profile of SEW-EURODRIVE units.                           |
| 18   | 0x00  | Data:<br>MOVILINK® parameter channel | Parameter subindex                                                                   |                                                                                                           |
| 19   | 0x20  | Data:<br>MOVILINK® parameter channel | Parameter indexes:<br>0x206c = 8300 = firmware part number                           |                                                                                                           |
| 20   | 0x6C  |                                      |                                                                                      |                                                                                                           |
| 21   | 0x00  | Data:<br>MOVILINK® parameter channel | Parameter value that has no meaning during read service.                             |                                                                                                           |
| 22   | 0x00  |                                      |                                                                                      |                                                                                                           |
| 23   | 0x00  |                                      |                                                                                      |                                                                                                           |
| 24   | 0x00  |                                      |                                                                                      |                                                                                                           |

1) For other values of the "Unit identifier", a request is forwarded to a lower-level device. The assignment of "Unit identifier" and the lower-level devices on the system buses is determined via the routing table of the MOVIFIT® unit (see chapter "The Modbus protocol (Modbus/TCP)" > "Protocol structure" > "Header").

### Parameter access response telegram

The response telegram contains the response to the MOVILINK® read service.

| Byte | Value               | Meaning                              | Interpretation                                                                  | Help                                                                                                      |
|------|---------------------|--------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 0    | 0x00                | Transaction identifier               | —                                                                               | For detailed description see Modbus/TCP specification and chapter "Modbus protocol (Modbus/TCP)" (→ 104). |
| 1    |                     |                                      |                                                                                 |                                                                                                           |
| 2    |                     |                                      |                                                                                 |                                                                                                           |
| 3    | Protocol identifier |                                      |                                                                                 |                                                                                                           |
| 4    | 0x00                | Length field                         | Number of bytes after byte 5: Must be equal to 11 for MOVILINK®.                |                                                                                                           |
| 5    | 0x11                |                                      |                                                                                 |                                                                                                           |
| 6    | 0xFF                | Unit identifier                      | Access to parameters of control board of MOVIFIT® unit itself. <sup>1)</sup>    |                                                                                                           |
| 7    | 0x17                | Function code                        | Service = FC23 (read and write register)                                        |                                                                                                           |
| 8    | 0x02                | Read reference number                | 8 byte MOVILINK®                                                                |                                                                                                           |
| 17   | 0x31                | Data:<br>MOVILINK® parameter channel | Management bytes: 0x31 = read                                                   | Data mapping and definition see setting and profile of SEW-EURODRIVE units.                               |
| 18   | 0x00                | Data:<br>MOVILINK® parameter channel | Parameter subindex                                                              |                                                                                                           |
| 19   | 0x20                | Data:<br>MOVILINK® parameter channel | Parameter index:<br>0x206c = 8300 = firmware part number                        |                                                                                                           |
| 20   | 0x6C                |                                      |                                                                                 |                                                                                                           |
| 21   | 0x00                | Data:<br>MOVILINK® parameter channel | The parameter value 0xA82e5b0d corresponds to firmware part number 28216102.53. |                                                                                                           |
| 22   | 0x00                |                                      |                                                                                 |                                                                                                           |
| 23   | 0x00                |                                      |                                                                                 |                                                                                                           |
| 24   | 0x00                |                                      |                                                                                 |                                                                                                           |

- 1) For other values of the "Unit identifier", a request is forwarded to a lower-level device. The assignment of "Unit identifier" and the lower-level devices on the system buses is determined via the routing table of the MOVIFIT® unit (see chapter "The Modbus protocol (Modbus/TCP)" > "Protocol structure" > "Header").

## 9 Modbus protocol (Modbus/TCP)

### 9.1 Description

Modbus/TCP is an open protocol based on TCP/IP. It was one of the first protocol types to become standard in industrial Ethernet interfaces for process data exchange.

Modbus/TCP has the following characteristics:

- Modbus frames are exchanged via the TCP/IP port 502.
- Every master IP address is accepted.
- Modbus exclusively uses the "Big Endian" coding (Motorola data format or high byte first).
- Access via "Peer Cop" is not possible. This is why it must be ensured that the used fieldbus master supports the "IO Scanning" function.

#### 9.1.1 Mapping and addressing

The logic Modbus address range is 64 k words and is addressed via the reference number (offset). Four different tables can be in the address range:

- Digital inputs (RO)
- Digital outputs (RW)
- Input register (RO)
- Output register (RW)

The tables can be separated or overlapping.

The MOVIFIT® unit provides the following data ranges:

- For process data transfer, there is a table that allows for write access (for setpoint values) as well as read access (for actual values).

This table starts at offset 4 and ends at offset  $0FF_{hex}$ . It contains the cyclically transferred process data words 1 – 32.

- An additional table is created by the controller for the process output data words. The table allows for one or several clients reading the current setpoints e.g. for visualization.

This table starts at offset  $104_{hex}$  and ends at offset  $1FF_{hex}$ .

- A third table is created to parameter access.

This table begins at offset  $200_{hex}$ , ends at offset  $2FF_{hex}$  and contains four words of the MOVILINK® parameter channel.

- The remaining address scope from offset  $400_{hex}$  to  $FFFF_{hex}$  is reserved and must not be addressed.

The data word at offset  $219_{hex}$  ( $8606_{dec}$ ) is a special case, it allows for writing (and reading) the timeout monitoring time.

### INFORMATION



With controllers by Schneider Electric, observe that the address range often starts at  $40001_{hex}$ . This corresponds to the value "0" for the offset.

### 9.1.2 Services (function codes)

For process data exchange, parameter data exchange and device identification, the device provides the following 4 FC (Function Codes) services.

- FC3 – Read holding registers  
Allows for reading one or several registers.
- FC16 – Write multiple registers  
Allows for writing one or several registers.
- FC23 – Read/write multiple registers  
Allows for a register block to be read and written simultaneously.
- FC43 – Read device identification  
Allows for device identification by reading the identity object.

### 9.1.3 Accessing services

The implemented registers and possible services (function codes) for data exchange are summarized in the following table:

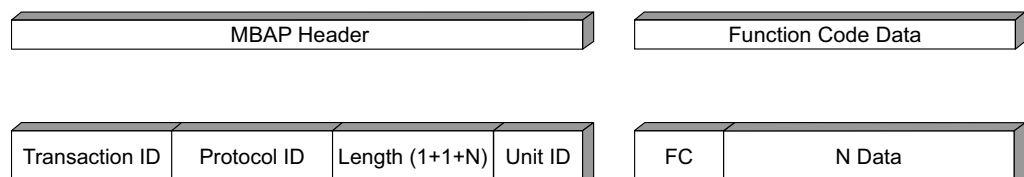
| Offset hex                                | Meaning when                          |                                        | Access           | Comment                                                                    |
|-------------------------------------------|---------------------------------------|----------------------------------------|------------------|----------------------------------------------------------------------------|
|                                           | Read                                  | Write                                  |                  |                                                                            |
| 0 – 3                                     | –                                     | –                                      | –                | Reserved                                                                   |
| 4 – FF                                    | Process input data (actual values)    | Process output data (setpoints)        | FC03, FC16, FC23 | 0 – 32 words                                                               |
| 100 – 103                                 | –                                     | –                                      | –                | Reserved                                                                   |
| 104 – 1FF                                 | Process output data (setpoints)       | –                                      | FC03             | For reading the setpoint values by a client other than the controlling one |
| 200 – 2FF                                 | Result non-cyclical parameter channel | Request non-cyclical parameter channel | FC03, FC16, FC23 | 4 words                                                                    |
| 300 – FFFF                                | –                                     | –                                      | –                | Reserved                                                                   |
| Special case: 219E (8606 <sub>dec</sub> ) | Fieldbus timeout interval, read value | Fieldbus timeout interval, write value | FC03, FC16       | Parameter P819: 16-bit value, timeout interval in ms                       |

## 9.2 Protocol structure

The Modbus protocol consists of a header and function code data.

The header is the same for all request and response telegrams as well as for error messages (exceptions).

Depending on the "function code", a different number of data is attached to the header.



9007200887174411

## 9.2.1 Header

The following table describes the protocol bytes of the header.

| Byte  | Designation                     | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | Transaction identifier          | Value: Often "0" (is simply copied by the server (slave).)                                                                                                                                                                                                                                                                                                                                                                    |
| 1     |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2     | Protocol identifier             | Value: 0                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3     |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4     | Length field (upper byte)       | Value: 0                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5     | Length field (lower byte)       | Number of function code data bytes + 1 ("Unit identifier")                                                                                                                                                                                                                                                                                                                                                                    |
| 6     | Unit identifier (slave address) | Slave address.<br>In order to access the MOVIFIT® process data, it must be set to "0" (0x00) or 255 (0xFF).<br>The following address assignments apply to the parameter channel access (Offset 200 <sub>hex</sub> – 203 <sub>hex</sub> ):<br><ul style="list-style-type: none"> <li>• 0 or 255 for parameters of the MOVIFIT® unit</li> <li>• 1 – 254 for parameters of a lower-level device connected to MOVIFIT®</li> </ul> |
| 7     | Function code                   | Requested service                                                                                                                                                                                                                                                                                                                                                                                                             |
| 8 – N | Data                            | Data depending on requested service                                                                                                                                                                                                                                                                                                                                                                                           |

Observe the following:

- The slave simply copies the "transaction identifier" (byte 0 and 1). It helps the master to identify related actions.
- The "protocol identifier" (byte 2 and 3) must always be "0".
- The length bytes (byte 4 and 5) determine the number of the following bytes. As the maximum telegram length is 255 bytes, the "upper byte" must be "0".
- The "unit identifier" (byte 6) is used for distinguishing between several connected nodes (e.g. bridges or gateways). It has the function of a subaddress that is only used for parameter access for units from SEW-EURODRIVE. The process data are always mapped to the device that is addressed via the "unit identifier" "0" or "FF<sub>hex</sub>".

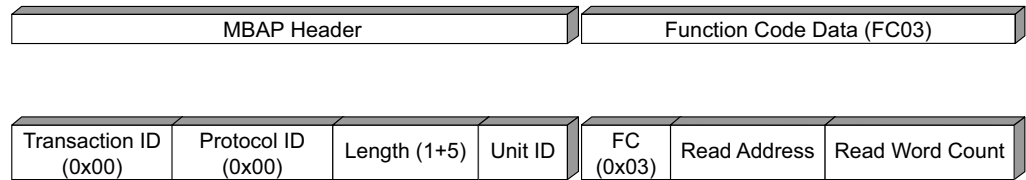
The assignment of "unit identifiers" to lower-level devices or the integrated power section is determined in the routing table of the controller configuration in PLC Editor. The "unit identifiers" are assigned according to the following table:

| Unit identifier | Option/interface                      |
|-----------------|---------------------------------------|
| 0 or 255        | MOVIFIT® controller                   |
| 1               | MOVIFIT® SC/FC power section          |
| 2               | MOVIMOT® 1 (only for MOVIFIT® MC)     |
| 3               | MOVIMOT® 2 (only for MOVIFIT® MC)     |
| 4               | MOVIMOT® 3 (only for MOVIFIT® MC)     |
| 16 – 21         | MOVIFIT® slaves with external CAN bus |

- The 7 bytes of the header are followed by the "function code" and the data.

### 9.2.2 Service FC3 – Read holding registers

The service "FC03 – Read holding registers" is used to read a variable number of registers.



9007200887224075

#### Example

Request:

| Byte  | Designation             | Meaning/permitted values                               |
|-------|-------------------------|--------------------------------------------------------|
| 0 – 6 | MBAP header             | See chapter "Header" (→ 106)                           |
| 7     | Function code           | Requested service<br>Value: 03 (Read Holding Register) |
| 8     | Reference number (high) | Value: Offset                                          |
| 9     | Reference number (low)  | Value: Offset                                          |
| 10    | Word count (high)       | Number of words (register)                             |
| 11    | Word count (low)        | Number of words (register)                             |

Response:

| Byte                        | Designation   | Meaning/permitted values                                                              |
|-----------------------------|---------------|---------------------------------------------------------------------------------------|
| 0 – 6                       | MBAP header   | See chapter "Header" (→ 106)                                                          |
| 7                           | Function code | Service<br>Value: 03 (Read Holding Register)                                          |
| 8                           | Byte count    | Number of following bytes<br>Value: 2 x N <sup>1)</sup>                               |
| 9 – 9+(2 x N) <sup>1)</sup> | Data          | Content of the respective register<br>Value: 2 – 2 x N data bytes depending on length |

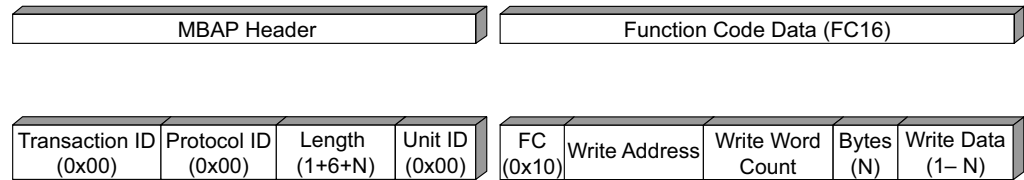
1) Number of registers

Exception:

| Byte  | Designation    | Meaning/permitted values     |
|-------|----------------|------------------------------|
| 0 – 6 | MBAP header    | See chapter "Header" (→ 106) |
| 7     | Function code  | 83 <sub>hex</sub>            |
| 8     | Exception code | Error code                   |

### 9.2.3 Service FC16 – Write multiple registers

The service "FC16 – Write multiple registers" is used to write a variable number of registers.



9007200887293707

#### Example

Request:

| Byte                          | Designation             | Meaning/permitted values                                                                            |
|-------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------|
| 0 – 6                         | MBAP header             | See chapter "Header" (→ 106)                                                                        |
| 7                             | Function code           | Requested service<br>Value: 16 (Write Multiple Registers)                                           |
| 8                             | Reference number (high) | Value: Offset                                                                                       |
| 9                             | Reference number (low)  | Value: Offset                                                                                       |
| 10                            | Word count (high)       | Number of words (register)                                                                          |
| 11                            | Word count (low)        | Number of words (register)                                                                          |
| 12                            | Byte count              | Number of following bytes<br>Value: $2 \times N^{1)}$                                               |
| 13 – 13+(2 x N) <sup>1)</sup> | Register values         | Value that is written in the respective register<br>Value: 2 – 2 x N data bytes depending on length |

1) Number of registers

Response:

| Byte  | Designation             | Meaning/permitted values                        |
|-------|-------------------------|-------------------------------------------------|
| 0 – 6 | MBAP header             | See chapter "Header" (→ 106)                    |
| 7     | Function code           | Service<br>Value: 16 (Write Multiple Registers) |
| 8     | Reference number (high) | Value: Offset                                   |
| 9     | Reference number (low)  | Value: Offset                                   |
| 10    | Word count (high)       | Number of words (register)                      |
| 11    | Word count (low)        | Number of words (register)                      |

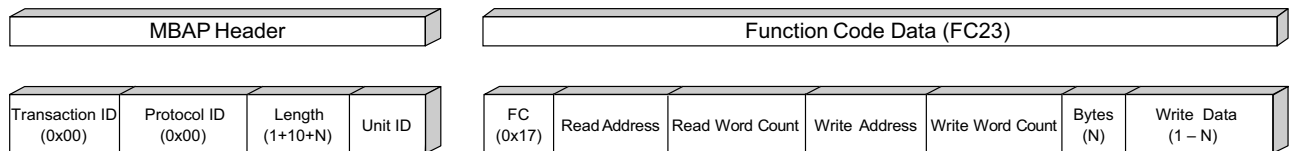
Exception:

| Byte  | Designation    | Meaning/permitted values     |
|-------|----------------|------------------------------|
| 0 – 6 | MBAP header    | See chapter "Header" (→ 106) |
| 7     | Function code  | 90 <sub>hex</sub>            |
| 8     | Exception code | Error code                   |



### 9.2.4 Service FC23 – Read/write multiple registers

With the service "FC23 – Read/write multiple registers", you can simultaneously write and read a variable number of registers. The write access is carried out first. Preferably, this service is used for the process data.



9007200887389707

#### Example

Request:

| Byte                          | Designation                   | Meaning/permitted values                                                                            |
|-------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------|
| 0 – 6                         | MBAP header                   | See chapter "Header" (→ 106)                                                                        |
| 7                             | Function code                 | Requested service<br>Value: 23 (Read/Write Multiple Registers)                                      |
| 8                             | Read reference number (high)  | Value: Offset                                                                                       |
| 9                             | Read reference number (low)   | Value: Offset                                                                                       |
| 10                            | Read word count (high)        | Number of bytes (register) that are read.<br>Value: always 0                                        |
| 11                            | Read word count (low)         | Number of bytes (register) that are read.                                                           |
| 12                            | Write reference number (high) | Value: Offset                                                                                       |
| 13                            | Write reference number (low)  | Value: Offset                                                                                       |
| 14                            | Write word count (high)       | Number of words (register) that are written.<br>Value: always 0                                     |
| 15                            | Write word count (low)        | Number of words (register) that are written.                                                        |
| 16                            | Write byte count              | Number of following bytes<br>Value: $2 \times N^{1)}$                                               |
| 17 – 17+(2 x N) <sup>1)</sup> | Write register values         | Value that is written in the respective register<br>Value: 2 – 2 x N data bytes depending on length |

1) Number of bytes that are written.

Response:

| Byte  | Designation   | Meaning/permitted values                                                              |
|-------|---------------|---------------------------------------------------------------------------------------|
| 0 – 6 | MBAP header   | See chapter "Header" (→ 106)                                                          |
| 7     | Function code | Service<br>Value: 23 (Read/Write Multiple Registers)                                  |
| 8     | Byte count    | Number of following bytes<br>Value: $2 \times n^{1)}$                                 |
| 9     | Data          | Content of the respective register<br>Value: 2 – 2 x n data bytes depending on length |

1) Number of registers that are read.

Exception:

| Byte  | Designation    | Meaning/permitted values     |
|-------|----------------|------------------------------|
| 0 – 6 | MBAP header    | See chapter "Header" (→ 106) |
| 7     | Function code  | 97 <sub>hex</sub>            |
| 8     | Exception code | Error code                   |

### 9.2.5 Service FC43 – Read device identifications

The service "FC43 – Read device identifications" is also referred to as MEI transport (MODBUS Encapsulated Interface Transport). It tunnels services and method calls. The service "Read device identification" is tunneled with the MEI-Type 0x0E. In accordance with Modbus specifications, there are 3 blocks ("Basic", "Regular" and "Extended") that can be read.

The unit supports "Basic" and "Regular" blocks (Conformity Level 02). The entire block is always read (streaming). This means that values "01" and "02" are permitted in the "Read device ID code". The "Object ID" must have the value "0". The response is not fragmented.

#### Example

Request:

| Byte  | Designation         | Meaning/permitted values                                    |
|-------|---------------------|-------------------------------------------------------------|
| 0 – 6 | MBAP header         | See chapter "Header" (→ 106)                                |
| 7     | Function code       | Requested service<br>Value: 43 (Read Device Identification) |
| 8     | MEI type            | Value: 0x0E                                                 |
| 9     | Read device ID code | Value: 01 or 02                                             |
| 10    | Object ID           | Value: 0                                                    |

Response:

| Byte                                     | Designation                                                                   | Meaning/permitted values                                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 – 6                                    | MBAP header                                                                   | See chapter "Header" (→ 106)                                                                                                                   |
| 7                                        | Function code                                                                 | Service<br>Value: 43 (Read Device Identification)                                                                                              |
| 8                                        | MEI type                                                                      | Value: 0x0E                                                                                                                                    |
| 9                                        | Read device ID code                                                           | Value: 01 or 02                                                                                                                                |
| 10                                       | Conformity level                                                              | Value: 02                                                                                                                                      |
| 11                                       | More follows                                                                  | If the identification data does not fit on one response, several request/response transactions are required.<br>Value: 0 (no further requests) |
| 12                                       | Next object ID                                                                | Value: 0                                                                                                                                       |
| 13                                       | Number of objects                                                             | Number of objects<br>Value (example): 3                                                                                                        |
| 14                                       | Object ID                                                                     | ID of first object                                                                                                                             |
| 15                                       | Object length                                                                 | Length of first object in bytes                                                                                                                |
| 16                                       | Object value                                                                  | Value of first object                                                                                                                          |
| 17 – Number of objects x 2 <sup>1)</sup> | Object ID, object length, and object value of all other objects <sup>2)</sup> | –                                                                                                                                              |

1) In the example up to 22

2) In this example, 2 more objects

Exception:

| Byte  | Designation    | Meaning/permitted values     |
|-------|----------------|------------------------------|
| 0 – 6 | MBAP header    | See chapter "Header" (→ 106) |
| 7     | Function code  | 43 <sub>hex</sub>            |
| 8     | Exception code | Error code                   |

## Objects

### MOVIFIT® Technology

| Object ID | Designation         | Type         | M/O       | Category | Value (example)        |
|-----------|---------------------|--------------|-----------|----------|------------------------|
| 0x00      | VendorName          | ASCII String | Mandatory | Basic    | SEW-EURODRIVE          |
| 0x01      | ProductCode         |              |           |          | SEW MOVIFIT TECHNOLOGY |
| 0x02      | MajorMinorRevisions |              |           |          | 823 568 0.10           |
| 0x03      | VendorUrl           |              | Optional  | Regular  | www.sew.de             |
| 0x04      | ProductName         |              |           |          | SEW MOVIFIT            |
| 0x05      | ModelName           |              |           |          | TECHNOLOGY             |

## 9.3 Connection management

8 Modbus connections are possible simultaneously. Only one of the connections can have write access to the process data range (controlling connection).

Connections that are no longer used must be disconnected by the master. If the slave detects an inactive connection, it assumes that the associated master is no longer active. In this case, the slave disconnects the connection that is no longer in use. Only then, the ninth connection can be established. If there are 8 active connections, the attempt to establish a ninth connection is cancelled (socket is closed on the server).

Connections 1 – 8 have the following characteristics:

- They operate independently.
- There is no prioritization.
- Only one controlling connection is permitted. This connection can change process data.

If a controlling connection has already been established via EtherNet/IP™, you cannot establish another controlling connection via Modbus/TCP.

The slave can at least buffer one frame with maximum Modbus length on receipt or transmission.

### 9.3.1 Sending process output data (requirements of a controlling connection)

Process data can only be sent in the following cases:

- The connection is already a controlling connection.
- No controlling connection has been established yet.

If the device accepts the connection, it adopts the process output data into the process data image or forwards the process data to the IEC program. As long as this connection is active, no other master can change the process output data (PO data).

### 9.3.2 Closing a connection

A connection is deleted from the internal connection list under the following conditions:

- The keep-alive time is over. The server does no longer receive responses afterwards.
- The socket returns a fault.
- The connection to the client has been disconnected.

If the connection was a controlling connection, no additional controlling connection can be established. If no valid process output data has been sent within the timeout interval, a fieldbus timeout is triggered.

The default keep-alive time is 10 seconds. If there is a controlling connection with the set timeout interval > 5 s, the keep-alive time is increased to 2 times the timeout interval.

In a controlling connection, the fieldbus timeout is displayed in the unit after the set timeout interval elapses during a break in the cable or an error in the socket. Then a new controlling connection can be established.

### 9.3.3 Timeout behavior

The timeout interval can be set in steps of 10 ms in a range between 0 s – 650 s.

- 0 s and 650 s means: Timeout monitoring is deactivated.
- 10 ms – 649.09 s means: Timeout monitoring is activated.

The timeout interval can be set as follows:

- Via register object  $219E_{\text{hex}}$  ( $8606_{\text{dec}}$ )
- Via parameter access to index  $8606$  via register object  $200_{\text{hex}}$  –  $203_{\text{hex}}$
- Via parameters in MOVITOOLS® MotionStudio (plug-in or in the parameter tree)

A change to the timeout interval (writing on index  $8606$ ) is activated after a re-boot.

The timeout monitoring is triggered when a controlling connection is activated. The fieldbus driver cyclically checks whether the last process output data update was received within the timeout interval.

If the timeout interval is set to 0 s or 65000 s, time monitoring is deactivated. No fieldbus timeout is detected in this case. This also applies when the controlling connection is dropped.

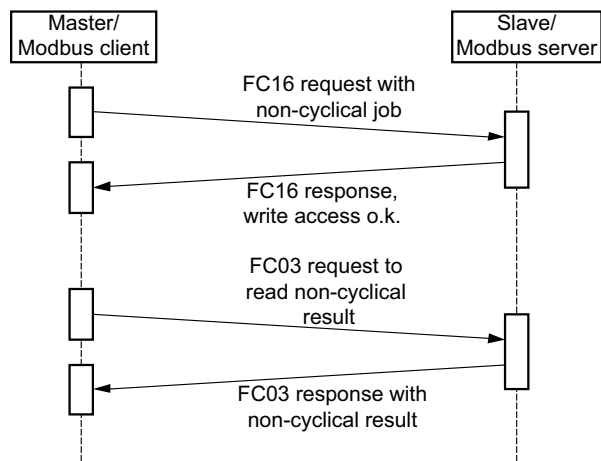
In the event of a timeout, the timeout response is executed as programmed in the IEC program.

## 9.4 Parameter access via Modbus/TCP

A parameter access via the MOVILINK® parameter channel in registers 200<sub>hex</sub> – 203<sub>hex</sub> via Modbus/TCP requires the services FC03, FC16 or FC23 (write and read access). Write access is used for storing non-cyclical requests in the corresponding registers. Read services read the responses from the same registers.

This method corresponds to the alternative concept according to the Modbus specifications "Network Messaging Specification for the MODBUS/TCP Protocol: Version 1.1" (Appendix A).

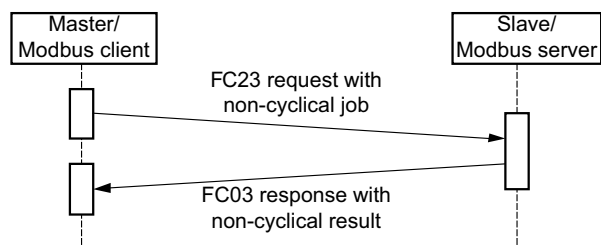
### 9.4.1 Procedure with FC16 and FC03



9007200887627659

The respective error code is generated if a write access is incorrect (see chapter "Fault codes (exception codes)" (→ 116)). In this way the write services are already processed by sending a write request (FC16), and the service confirmation is carried out by evaluating the write response. Later on, the master will send a read request (FC03) in order to read out the values that have now been written into the register.

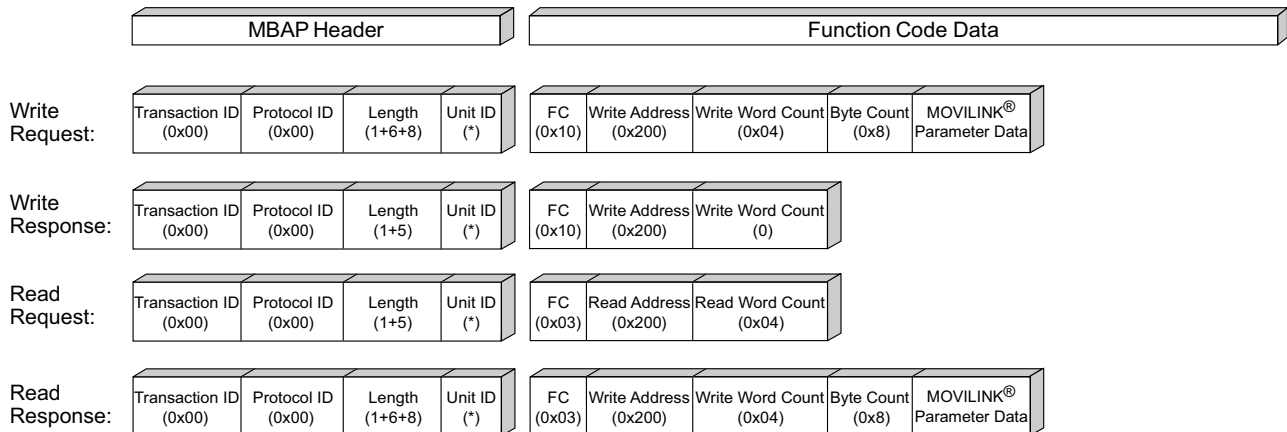
### 9.4.2 Procedure with FC23



9007200887695115

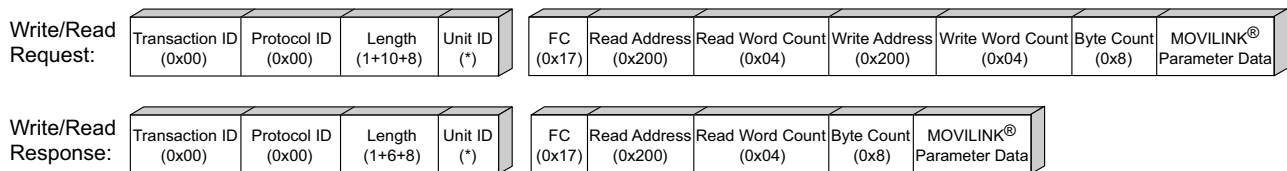
With FC23 the result is returned directly in the response.

### 9.4.3 Protocol structure



9007200887841291

Or:



9007200887888267

\* The "unit identifier" (UI-D) is used in gateway operation to map registers 200<sub>hex</sub> – 203<sub>hex</sub> in lower-level nodes (see chapter "Header" (→ 106)).

Refer to chapter "MOVILINK® parameter channel" (→ 114) for a description of the MOVILINK® parameter data (8 byte) and how they are mapped in registers 200<sub>hex</sub> – 203<sub>hex</sub>.

### 9.4.4 MOVILINK® parameter channel

The following table shows the structure of the MOVILINK® non-cyclical parameter channel (8 bytes). The structure is described in detail in an example. In the example, a request is made to write 500 ms to the fieldbus timeout (in 8606) via the MOVILINK® parameter channel.

| Offset             | Meaning    | Example           |
|--------------------|------------|-------------------|
| 200 <sub>hex</sub> | Management | 32 <sub>hex</sub> |
| 200 <sub>hex</sub> | Subindex   | 00 <sub>hex</sub> |
| 201 <sub>hex</sub> | High index | 21 <sub>hex</sub> |
| 201 <sub>hex</sub> | Low index  | 9E <sub>hex</sub> |
| 202 <sub>hex</sub> | MSB data   | 00 <sub>hex</sub> |
| 202 <sub>hex</sub> | Data       | 00 <sub>hex</sub> |
| 203 <sub>hex</sub> | Data       | 01 <sub>hex</sub> |
| 203 <sub>hex</sub> | LSB data   | F4 <sub>hex</sub> |

You can access the parameter channel with FC03, FC16 and FC23. You can assign a task to the parameter channel in the administration byte when using a write access. The task itself is a MOVILINK® service such as "Write", "WriteVolatile" or "Read". The result is read with a read access.

The values in the example (writing fieldbus timeout) have the following meaning:

- Offset 200<sub>hex</sub> = 3200<sub>hex</sub> (administration = write 4 bytes/subindex = 0)
- Offset 201<sub>hex</sub> = 219E<sub>hex</sub> (Index = 8606)
- Offset 202<sub>hex</sub> = 0 (data high)
- Offset 203<sub>hex</sub> = 01F4<sub>hex</sub> (data low = 500)

### Management byte

The management byte in the MOVILINK® parameter channel (byte 0) is defined as follows:

| Management byte (1 byte) |                        |                                                                       |
|--------------------------|------------------------|-----------------------------------------------------------------------|
| Bit                      | Meaning                | Coding and function                                                   |
| 0<br>(LSB)               | Service identification | 0000 = No service                                                     |
| 1                        |                        | 0001 = Read parameter                                                 |
| 2                        |                        | 0010 = Write parameter                                                |
| 3                        |                        | 0011 = Write Parameter Volatile                                       |
| 4                        | Data length            | 0100 = Read minimum                                                   |
| 5                        |                        | 0101 = Read maximum                                                   |
| 6                        |                        | 0110 = Read default                                                   |
| 7<br>(MSB)               |                        | 0111 = Read scale                                                     |
|                          |                        | 1000 = Read attribute                                                 |
|                          |                        | 00 = 1 byte                                                           |
|                          |                        | 01 = 2 bytes                                                          |
|                          |                        | 10 = 3 bytes                                                          |
|                          |                        | 11 = 4 bytes                                                          |
|                          |                        | Must be changed (toggled) on every new task in cyclical transmission. |
|                          |                        | 0 = No error during execution of service                              |
|                          |                        | 1 = Error during execution of service                                 |

The individual bits have the following functions:

#### • Bits 0 – 3

Contain the service identification. These bits determine which service is to be executed.

#### • Bit 4 and bit 5

Specify the data length in byte. For frequency inverters from SEW-EURODRIVE, this value must be set to 4 bytes.

#### • Bit 6 (handshake bit)

Is used as acknowledgment bit between client and server. As the MOVILINK® parameter channel is transmitted cyclically, the service execution must be triggered by edge control via the handshake bit. For this purpose, the value of this bit is toggled for each new service to be executed. The frequency inverter uses the handshake bit to signal whether the service has been executed or not. The service has been executed if the handshake bit received in the controller is identical with the sent handshake bit.

#### • Bit 7 (status bit)

Indicates whether the service was executed properly or whether errors occurred.

## INFORMATION

- For the index, subindex, factor etc. of a parameter, refer to the parameter tree in the MOVITOOLS® MotionStudio engineering software.
- Refer to chapter "Parameterizing the power section" (→ 158) for a detailed description of the parameters.



### 9.5 Fault codes (exception codes)

If a fault occurs while processing a "function code", the fault is reported to the Modbus client in an "exception response".

The following "exception codes" are returned by a unit from SEW-EURODRIVE:

| Exception code hex | Designation              | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01                 | ILLEGAL FUNCTION         | The slave unit does not support the "function code" transmitted in the request.                                                                                                                                                                                                                                                                                                                                                                                             |
| 02                 | ILLEGAL DATA ADDRESS     | You have entered an invalid data address for the access to the Modbus slave. This can be due to the following reasons: <ul style="list-style-type: none"> <li>• Invalid start address when accessing the Modbus slave registers (does not exist, or "function code" does not work with this address)</li> <li>• Invalid combination of start address and length</li> <li>• No symmetric access with "read/write"</li> <li>• Wrong object ID (on access via FC43)</li> </ul> |
| 03                 | ILLEGAL DATA VALUE       | A part of the data field of the Modbus request contains a value invalid for the Modbus slave. This can be due to the following reasons: <ul style="list-style-type: none"> <li>• The "word count" contains an invalid value (smaller than 1 or larger than 125)</li> <li>• The received PDU length is too short or too long (depending on the specified "word count")</li> <li>• Internal error when reading or writing the process data</li> </ul>                         |
| 04                 | SLAVE DEVICE FAILURE     | Error when accessing MOVILINK® parameter (e. g. internal timeout)                                                                                                                                                                                                                                                                                                                                                                                                           |
| 06                 | SLAVE DEVICE BUSY        | There is already a controlling connection either via another Modbus controller or another fieldbus system.                                                                                                                                                                                                                                                                                                                                                                  |
| 0A                 | GATEWAY PATH UNAVAILABLE | The data cannot be forwarded to a subsystem.                                                                                                                                                                                                                                                                                                                                                                                                                                |



## 9.6 Technical data, Modbus/TCP interface

| Modbus/TCP                    | MOVIFIT® function level "Technology"                                                                                                                                                                                       |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic baud rate detection | 10 MBd/100 MBd                                                                                                                                                                                                             |
| Connection technology         | M12, RJ45 (push-pull) and RJ45 plug connector (in ABOX)                                                                                                                                                                    |
| Integrated switch             | Supports auto-crossing, auto-negotiation.                                                                                                                                                                                  |
| Maximum line length           | 100 m according to IEEE 802.3                                                                                                                                                                                              |
| Addressing                    | 4 byte IP address or MAC-ID (00-0F-69-xx-xx-xx)<br>Configurable via DHCP server or MOVITOOLS® MotionStudio with version 5.5 and higher<br>Default value of the address (depending on S11 DIP switch setting): 192.168.10.4 |
| Vendor ID                     | SEW-EURODRIVE                                                                                                                                                                                                              |
| Supported services            | FC03, FC16, FC23, FC43                                                                                                                                                                                                     |

## 10 Error diagnostics for operation on EtherNet/IP™ and Modbus/TCP

The diagnostics procedures described in the following section describes the integration of the MOVIFIT® unit into an Ethernet network and the error analysis method for the following problems:

- Frequency inverter is not properly integrated in the EtherNet/IP™ or Modbus/TCP network.
- Frequency inverter cannot be controlled using the master (scanner).

For further information, especially on the MOVIFIT® programming, refer to the "MOVI-PLC® Programming in the PLC Editor" system manual.

For additional diagnostic information, refer to the online status display in the EtherNet/IP™ master (scanner), in the Modbus/TCP master and the corresponding online help.

Diagnostics comprises several steps:

1. "Checking the status LEDs of the unit" (→ 118)
2. "Checking the status LED and the status display at the fieldbus master" (→ 119)
3. "Checking the fault sources" (→ 119)

### 10.1 Checking the status LEDs of the unit

For detailed information on the individual LED statuses, refer to chapter "Status LEDs" (→ 37). The following table lists the resulting unit statuses and possible causes:

| Status LED           |                      | Operating status     | Possible cause                                                                                 |
|----------------------|----------------------|----------------------|------------------------------------------------------------------------------------------------|
| MS                   | NS                   |                      |                                                                                                |
| Off                  | Off                  | Off                  | No voltage supply.                                                                             |
| Red                  | Red                  | Reset                | Unit is in reset state.                                                                        |
| Red                  | — <sup>1)</sup>      | Error                | Device has internal error.                                                                     |
| Green flashing       | Off                  | IP stack starting    | If DHCP is activated, the unit remains in this status until an IP address is assigned.         |
| Red flashing         | Red                  | IP conflict          | Conflict regarding IP address. Another node in the network uses the same IP address.           |
| Green – red flashing | Green – red flashing | LED test             | All LED statuses are activated briefly for the LED test.                                       |
| Green flashing       | Green flashing       | Application starting | All functions of the unit (e.g. process data and connections to the master) are now activated. |
| Green                | Green flashing       | Operational          | The unit is connected to the fieldbus, but there is no controlling connection to the master.   |
| Green                | Green                | Connected            | Controlling connection has been established with a master.                                     |
| Green                | Red flashing         | Timeout              | A previously controlling connection is in timeout state.                                       |

1) The state of this LED has no meaning.

If a conflict regarding the IP address is detected, check the IP address parameters and, if necessary, reset them. Follow the instructions in chapter "Setting the IP address parameters" (→ 28) or use the MOVITOOLS® MotionStudio engineering software.

If no controlling connection with the master is established, check the communication via Ethernet. To do so, execute the PING and IPCONFIG commands via the DOS console on your PC.

### 10.2 Checking the status LED and the status display at the fieldbus master

Use the documentation of the controller or the master module for checking the status LED and the status display.

Should there be no working EtherNet/IP™ or Modbus/TCP master yet, you can use the SEW-EURODRIVE Ethernet master simulator for test or startup purposes. The latest version of the Ethernet master simulator can be downloaded from the SEW-EURODRIVE homepage → [www.sew-eurodrive.com](http://www.sew-eurodrive.com). You can use the Ethernet master simulator to exchange process or parameter data with EtherNet/IP or Modbus/TCP profile with an SEW-EURODRIVE fieldbus interface.

### 10.3 Checking the fault sources

If the unit status is "Connected", the data exchange between master (scanner) and slave is active. If the data is not transferred to the IEC application of the unit via EtherNet/IP™ or Modbus/TCP correctly, check the following possible fault sources:

| Fault source                                                                                                                    | Measure                                                     |
|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Are the correct values for the process data words displayed in the parameter tree or in the plug-in for the application module? | If yes, continue with line 6.                               |
| Is the process data exchange activated in the master?                                                                           | –                                                           |
| Is the process data written to the correct location in the master?                                                              | Check the tags and master mapping.                          |
| Is the PLC in RUN mode or does active forcing overwrite the transfer of the normal process data words to the drive?             | –                                                           |
| Does the controller send data to the unit?                                                                                      | Contact the controller manufacturer for further assistance. |
| Are the process data words being used correctly in the IEC program?                                                             | –                                                           |
| Which status is displayed for the communication interface via the "FBusGetInfo" function block in the IEC program?              | –                                                           |

## 11 Process data description in transparent mode

### 11.1 Process image

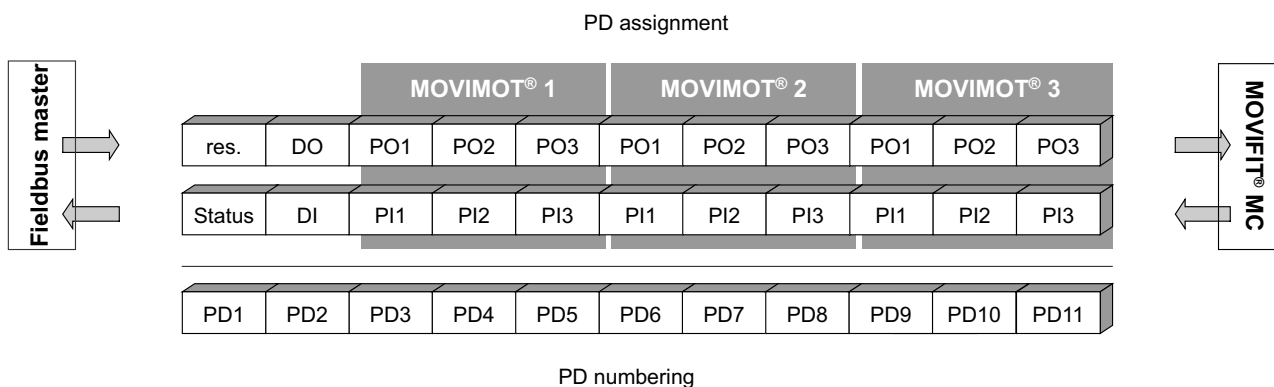
The process image that is exchanged between the fieldbus master and the MOVIFIT® unit depends on the MOVIFIT® unit type.

The following figures show the process images between fieldbus master and the MOVIFIT® unit.

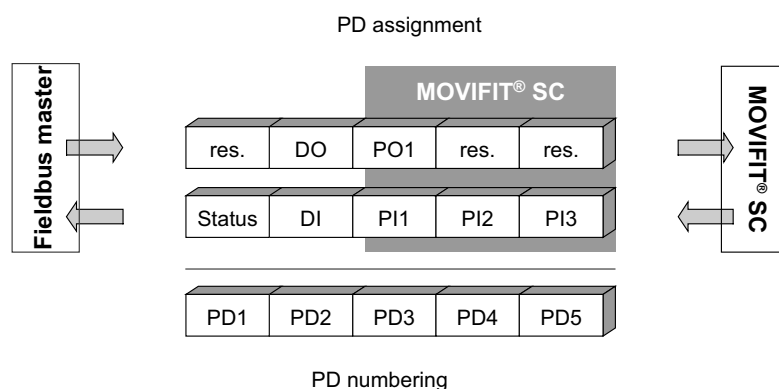
The following abbreviations are used in the figures:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

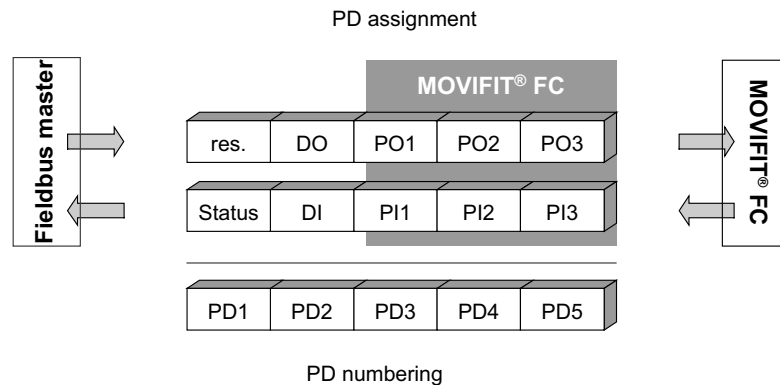
#### MOVIFIT® MC



#### MOVIFIT® SC

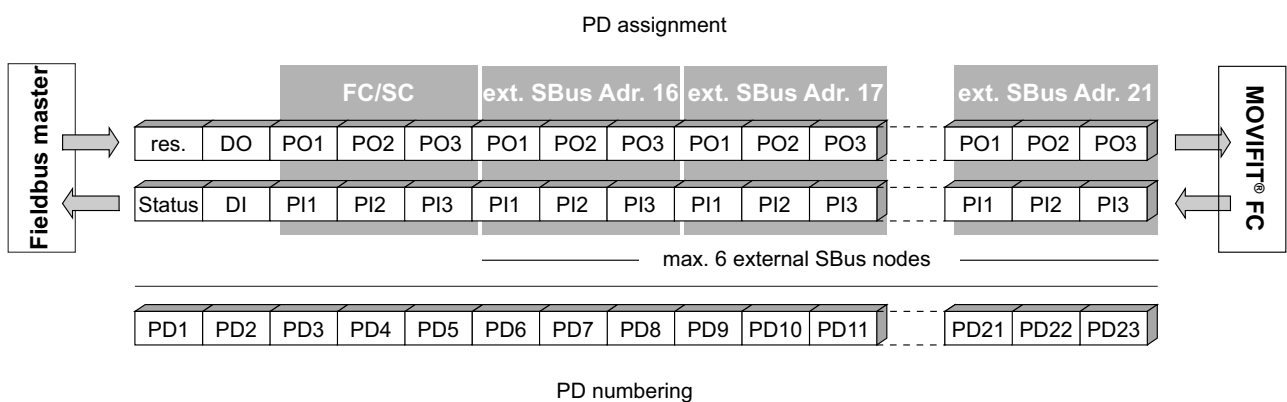


### MOVIFIT® FC



9007200223971083

### MOVIFIT® SC/FC with e.g. 6 MOVIFIT® FC slaves



9007200223975563

## 11.2 Status word of the MOVIFIT® unit

The status word of the MOVIFIT® unit contains diagnostics information of the MOVIFIT® unit that is set up for evaluation in the higher-level PLC application. The signals are transferred to the controller via parameters or via the process data channel.

The status word of the MOVIFIT® unit is defined as follows:

| MOVIFIT® status word (2 bytes) |                                       |                                                                                                                                                          |
|--------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                            | Meaning                               | Coding and function                                                                                                                                      |
| 0                              | Maintenance switch (mains OFF)        | 1 = maintenance switch has been actuated. Supply system is switched off.<br>0 = maintenance switch has not been actuated (OK).                           |
| 1                              | Undervoltage 24 V-S                   | 1 = the actuator voltage DO00 – DO03 falls below the limit value.<br>0 = the actuator voltage DO00 – DO03 does not fall below the limit value (OK).      |
| 2                              | Inverter voltage not applied (24 V-P) | 1 = 24 V-P for integrated frequency inverter (MOVIFIT® FC) or external MOVIMOT® inverter is not available.<br>0 = 24 V-P is available (OK).              |
| 3 – 6                          | –                                     | Reserved = 0                                                                                                                                             |
| 7                              | MOVIFIT® system fault                 | 1 = MOVIFIT® system fault is present. <sup>1)</sup><br>0 = MOVIFIT® system fault is not present.                                                         |
| 8                              | Overload actuator voltage DO00        | 1 = Short circuit/overload of the actuator supply for digital output DO00 is present.<br>0 = Short circuit/overload is not present (actuator supply OK). |

| MOVIFIT® status word (2 bytes) |                                   |                                                                                                                                                          |
|--------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                            | Meaning                           | Coding and function                                                                                                                                      |
| 9                              | Overload actuator voltage DO01    | 1 = Short circuit/overload of the actuator supply for digital output DO01 is present.<br>0 = Short circuit/overload is not present (actuator supply OK). |
| 10                             | Overload actuator voltage DO02    | 1 = Short circuit/overload of the actuator supply for digital output DO02 is present.<br>0 = Short circuit/overload is not present (actuator supply OK). |
| 11                             | Overload actuator voltage DO03    | 1 = Short circuit/overload of the actuator supply for digital output DO03 is present.<br>0 = Short circuit/overload is not present (actuator supply OK). |
| 12                             | Overload sensor voltage group I   | 1 = Short circuit/overload of the sensor supply group I (VO24-I) is present.<br>0 = Short circuit/overload is not present (sensor supply OK).            |
| 13                             | Overload sensor voltage group II  | 1 = Short circuit/overload of the sensor supply group II (VO24-II) is present.<br>0 = Short circuit/overload is not present (sensor supply OK).          |
| 14                             | Overload sensor voltage group III | 1 = Short circuit/overload of the sensor supply group III (VO24-III) is present.<br>0 = Short circuit/overload is not present (sensor supply OK).        |
| 15                             | Overload sensor voltage group IV  | 1 = Short circuit/overload of the sensor supply group IV (VO24-IV) is present.<br>0 = Short circuit/overload is not present (sensor supply OK).          |

1) See parameter P012, index 8310 (fault status) in chapter "Parameterization of the power section".

The logical communication status "0" signals the status OK for each signal. This ensures that no asynchronous startup sequences from the bus master and the PLC can cause incorrect diagnostic messages when the systems are started up (bus startup with user data = 0).

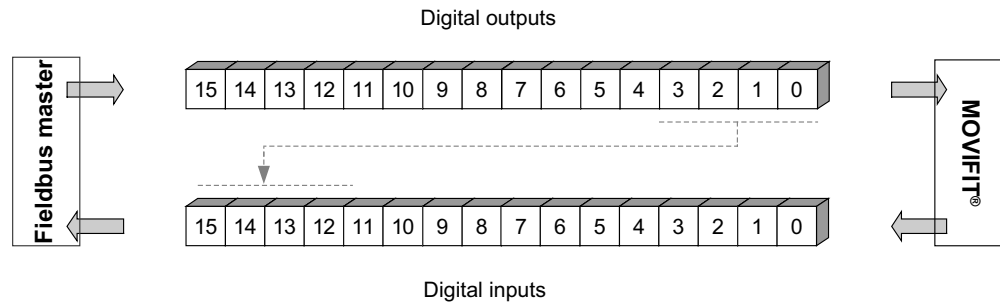
## INFORMATION



If the actuator voltage 24V\_S is not wired, bit 1 is permanently set to "1".

### 11.3 Digital inputs/outputs

The input/output bytes of the MOVIFIT® unit for 12DI/4DIO (digital inputs/digital outputs) are defined as follows:



14705884427

#### Digital inputs (DI)

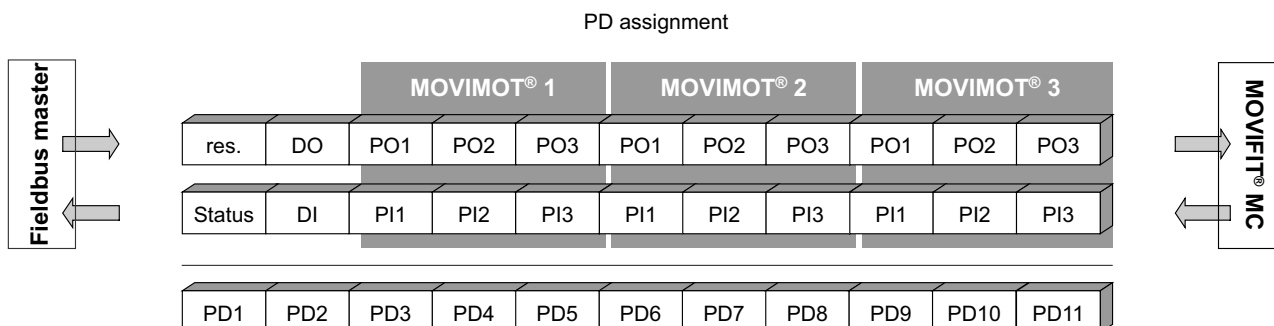
| Digital inputs (2 bytes) |                                                 |
|--------------------------|-------------------------------------------------|
| Bit                      | Meaning                                         |
| 0                        | Digital input DI 00                             |
| 1                        | Digital input DI 01                             |
| 2                        | Digital input DI 02                             |
| 3                        | Digital input DI 03                             |
| 4                        | Digital input DI 04                             |
| 5                        | Digital input DI 05                             |
| 6                        | Digital input DI 06                             |
| 7                        | Digital input DI 07                             |
| 8                        | Digital input DI 08                             |
| 9                        | Digital input DI 09                             |
| 10                       | Digital input DI 10                             |
| 11                       | Digital input DI 11                             |
| 12                       | Digital input DI 12/status digital output DO 00 |
| 13                       | Digital input DI 13/status digital output DO 01 |
| 14                       | Digital input DI 14/status digital output DO 02 |
| 15                       | Digital input DI 15/status digital output DO 03 |

#### Digital outputs (DO)

| Digital outputs (1 byte) |                      |
|--------------------------|----------------------|
| Bit                      | Meaning              |
| 0                        | Digital output DO 00 |
| 1                        | Digital output DO 01 |
| 2                        | Digital output DO 02 |
| 3                        | Digital output DO 03 |
| 4 – 15                   | Reserved = 0         |

### 11.4 Process data between a MOVIMOT® inverter and MOVIFIT® MC

In transparent mode, a MOVIMOT® inverter connected to the MOVIFIT® MC via RS485, is addressed with 3 process data words.



9007200223270923

| Process data MOVIMOT® 1 |                    |
|-------------------------|--------------------|
| Process output data     | Process input data |
| PO1: Control word       | PI1: Status word 1 |
| PO2: Speed in %         | PI2: Current       |
| PO3: Ramp               | PI3: Status word 2 |

The following abbreviations are used in the figure:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

#### 11.4.1 Assignment of MOVIMOT® control word

The MOVIMOT® control word is defined as follows:

| MOVIMOT® control word (2 bytes) |             |                                                                                    |
|---------------------------------|-------------|------------------------------------------------------------------------------------|
| Bit                             | Meaning     | Coding and function                                                                |
| 0                               | Enable/stop | 011 = Enable<br>otherwise stop                                                     |
| 1                               | Enable/stop |                                                                                    |
| 2                               | Enable/stop |                                                                                    |
| 3 – 5                           | –           | Reserved = 0                                                                       |
| 6                               | Error reset | If there is a unit fault, the fault can be reset by changing this bit from 0 to 1. |
| 7 – 15                          | –           | Reserved = 0                                                                       |

### INFORMATION



The assignment of the control word can change depending on the DIP switch setting of the MOVIMOT® additional functions. The bits 8 - 15 are then partially assigned. Refer to the "MOVIMOT® MM..D" operating instructions for more information.



#### 11.4.2 Coding of the speed setpoint

The speed setpoint is given as a relative value in percentage. It is based on the maximum speed that is set with the setpoint potentiometer f1 of the MOVIMOT® inverter.

Coding:                 $C000_{hex} = -100\%$  (counterclockwise direction)  
                               $4000_{hex} = +100\%$  (clockwise direction)  
                              1 digit = 0.0061%

Example:              80%  $n_{max}$  (counterclockwise rotation)

Calculation:           $-\frac{80\%}{0.0061} = -13115_{dec} = CCC5_{hex}$

#### 11.4.3 Coding of the ramp

The current integrator ramp is transferred in process output data word PO3. The indicated time refers to a change in speed of 1500 1/min.

Coding:                1 digit = 1 ms  
 Range:                100 ms – 10000 ms  
 Example:              2.0 s = 2000 ms =  $2000_{dec} = 07D0_{hex}$

#### 11.4.4 Assignment of MOVIMOT® status word 1

The MOVIMOT® status word 1 is defined as follows:

| MOVIMOT® status word 1 (2 bytes) |                                                                                        |                                                                                                                                                       |
|----------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                              | Meaning                                                                                | Coding and function                                                                                                                                   |
| 0                                | Output stage enabled                                                                   | 1 = MOVIMOT® is enabled.<br>0 = MOVIMOT® is not enabled.                                                                                              |
| 1                                | Inverter ready                                                                         | 1 = MOVIMOT® is ready.<br>0 = MOVIMOT® is not ready.                                                                                                  |
| 2                                | PO data enabled                                                                        | 1 = Process data is enabled. The drive can be controlled via fieldbus.<br>0 = Process data is inhibited. The drive cannot be controlled via fieldbus. |
| 3 – 4                            | –                                                                                      | Reserved = 0                                                                                                                                          |
| 5                                | Failure/warning                                                                        | 1 = Failure/warning present.<br>0 = No failure/warning present.                                                                                       |
| 6 – 7                            | –                                                                                      | Reserved = 0                                                                                                                                          |
| 8 – 15                           | If no failure/warning is present (bit 5 = 0): Unit state of the inverter power section | 0 = 24 V operation<br>2 = No enable<br>4 = Enable<br>18 = Manual mode active                                                                          |
|                                  | If a failure/warning is present (bit 5 = 1): Fault number                              | Fault number                                                                                                                                          |

#### 11.4.5 Coding of the current value

The power section returns the actual value of the output current as a relative value in percentage. The output current refers to the nominal unit current  $I_N$ .

Coding: 1 digit = 0.1%  $I_N$

Range: Signed 16 bit integer

Example:  $0320_{\text{hex}} = 800 \times 0.1\% I_N = 80\% I_N$

#### 11.4.6 Assignment of MOVIMOT® status word 2

The MOVIMOT® status word 2 is defined as follows:

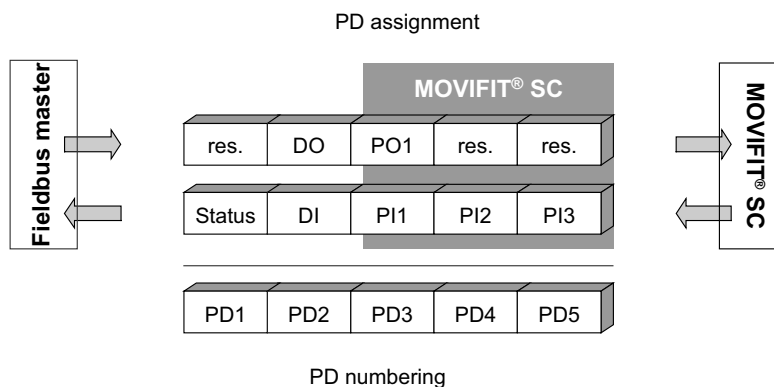
| MOVIMOT® status word 2 (2 bytes) |                                         |                                                                                                                                                       |
|----------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                              | Meaning                                 | Coding and function                                                                                                                                   |
| 0                                | Output stage enabled                    | 1 = MOVIMOT® is enabled.<br>0 = MOVIMOT® is not enabled.                                                                                              |
| 1                                | Inverter ready                          | 1 = MOVIMOT® is ready.<br>0 = MOVIMOT® is not ready.                                                                                                  |
| 2                                | PO data enabled                         | 1 = Process data is enabled. The drive can be controlled via fieldbus.<br>0 = Process data is inhibited. The drive cannot be controlled via fieldbus. |
| 3 – 4                            | –                                       | Reserved = 0                                                                                                                                          |
| 5                                | Failure/warning                         | 1 = Failure/warning present.<br>0 = No failure/warning present.                                                                                       |
| 6 – 7                            | –                                       | Reserved = 0                                                                                                                                          |
| 8                                | DO1 brake                               | 1 = Brake is applied.<br>0 = Brake is released.                                                                                                       |
| 9                                | DO2 (ready for operation) <sup>1)</sup> | 1 = Input DO1 is set.<br>0 = Input DO1 is not set.                                                                                                    |
| 10                               | DI1 (CW)                                | 1 = Input DI1 is set.<br>0 = Input DI1 is not set.                                                                                                    |
| 11                               | DI2 (CCW)                               | 1 = Input DI2 is set.<br>0 = Input DI2 is not set.                                                                                                    |
| 12                               | DI3 (setpoint f2)                       | 1 = Input DI3 is set.<br>0 = Input DI3 is not set.                                                                                                    |
| 13 – 15                          | –                                       | Reserved = 0                                                                                                                                          |

1) The functionality of the output can change depending on the additional function setting.

## 11.5 Process data between the integrated motor starter and MOVIFIT® SC

The motor starter can be used for single or dual-motor operation. The process data assignment is the same for both modes of operation.

In transparent mode, for SC single-motor operation or SC dual-motor operation, 1 process output data word and 3 process input data words are transferred:



9007200223966603

| Process data         |                            |
|----------------------|----------------------------|
| Process output data  | Process input data         |
| PO1: SC control word | PI1: Status word drive 1   |
| –                    | PI2: Status word drive 2   |
| –                    | PI3: Current drive 1 and 2 |

The following abbreviations are used in the figure:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

### 11.5.1 Assignment of MOVIFIT® SC control word

The MOVIFIT® SC control word contains the control bit for single-motor operation with reversal of direction of rotation and dual-motor operation with one direction of rotation each.

The MOVIFIT® SC control word is defined as follows:

| MOVIFIT® SC control word (2 bytes) |                     |                                                                                                                                   |
|------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Bit                                | Meaning             | Coding and function                                                                                                               |
| 0                                  | Enable/stop drive 1 | 1 = Enable drive 1.<br>0 = Inhibit drive 1.                                                                                       |
| 1                                  | Enable/stop drive 2 | Single-motor operation: Bit has no function<br>Dual-motor operation:<br>1 = Enable drive 2.<br>0 = Inhibit drive 2.               |
| 2                                  | CW/CCW operation    | Single-motor operation:<br>1 = Request "CCW" rotation.<br>0 = Request "CW" rotation.<br>Dual-motor operation: Bit has no function |
| 3 – 5                              | –                   | Reserved = 0                                                                                                                      |
| 6                                  | Error reset         | If there is a unit fault, the fault can be reset by changing this bit from 0 to 1.                                                |
| 7                                  | –                   | Reserved = 0                                                                                                                      |

| MOVIFIT® SC control word (2 bytes) |                                               |                                                                                                                                                                                   |
|------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                                | Meaning                                       | Coding and function                                                                                                                                                               |
| 8                                  | Brake release of drive 1 without drive enable | The function can be inhibited by setting a parameter.<br>1 = Release brake of drive 1 without drive enable.<br>0 = Do not release brake of drive 1.                               |
| 9                                  | Brake release of drive 2 without drive enable | Single-motor operation: Bit has no function<br>Dual-motor operation <sup>1)</sup> :<br>1 = Release brake of drive 2 without drive enable.<br>0 = Do not release brake of drive 2. |
| 10                                 | Deactivating the phase sequence monitoring    | Dual-motor operation:<br>1 = Phase sequence monitoring is deactivated.<br>0 = Phase sequence monitoring is not deactivated.                                                       |
| 11 – 15                            | –                                             | Reserved = 0                                                                                                                                                                      |

1) The function can be inhibited by setting a parameter.

### 11.5.2 Assignment of MOVIMOT® SC status word

The MOVIFIT® SC status word is available separately for each drive. This allows the individual drive channels to signal independent status messages in dual-motor operation.

The MOVIFIT® SC control word is defined as follows:

| MOVIFIT® SC status word (2 bytes) |                                                                                       |                                                                                                  |
|-----------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Bit                               | Meaning                                                                               | Coding and function                                                                              |
| 0                                 | Drive enabled                                                                         | 1 = Drive is enabled.<br>0 = Drive is inhibited.                                                 |
| 1                                 | Drive ready                                                                           | 1 = MOVIFIT® starter power section is ready.<br>0 = MOVIFIT® starter power section is not ready. |
| 2                                 | Status of brake output                                                                | 1 = Brake output is set.<br>0 = Brake output is not set.                                         |
| 3                                 | In operating mode as SBus slave: Input DI100<br>Otherwise: No function                | 1 = Input DI100 is set.<br>0 = Input DI100 is not set.<br>Reserved = 0                           |
| 4                                 | In operating mode as SBus slave: Input DI101<br>Otherwise: No function                | 1 = Input DI101 is set.<br>0 = Input DI101 is not set.<br>Reserved = 0                           |
| 5                                 | Failure/warning                                                                       | 1 = Failure/warning present.<br>0 = No failure/warning present.                                  |
| 6                                 | In operating mode as SBus slave: Input DI102<br>Otherwise: No function                | 1 = Input DI102 is set.<br>0 = Input DI102 is not set.<br>Reserved = 0                           |
| 7                                 | In operating mode as SBus slave: Input DI103<br>Otherwise: No function                | 1 = Input DI103 is set.<br>0 = Input DI103 is not set.<br>Reserved = 0                           |
| 8 – 15                            | If no failure/warning is present (bit 5 = 0): Unit status of the starter or the drive | 0 = Starter not ready<br>2 = No enable<br>4 = Enable<br>18 = Manual mode active                  |
|                                   | If a failure/warning is present (bit 5 = 1): Fault number                             | Fault number                                                                                     |

### 11.5.3 Coding of the current value

The MOVIFIT® unit returns the output current information for drive 1 and drive 2 via the third process input data word. In single-motor operation, the current value for drive 2 is set to "0".

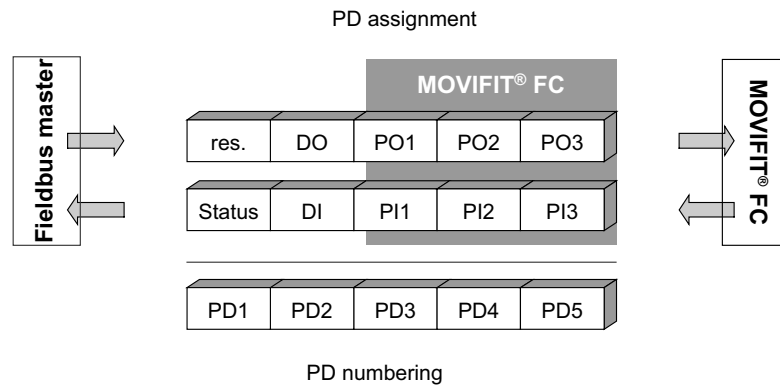
The following table shows the coding of the current values:

| Process input data word current (2 bytes)                                                 |                                                                                           |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Current drive 2                                                                           | Current drive 1                                                                           |
| Coding with 8 bit:<br>0 – (2 <sup>8</sup> -1) corresponds to 0 – 200% I <sub>N,unit</sub> | Coding with 8 bit:<br>0 – (2 <sup>8</sup> -1) corresponds to 0 – 200% I <sub>N,unit</sub> |

### 11.6 Process data between the integrated frequency inverter and MOVIFIT® FC

The integrated frequency inverter works with the same process data interface as MOVIMOT®.

In transparent mode, 3 process output data words and 3 process input data words are exchanged between MOVIFIT® FC and the integrated frequency inverter:



9007200223971083

| Process data                  |                            |
|-------------------------------|----------------------------|
| Process output data           | Process input data         |
| PO1: Control word             | PI1: Status word 1         |
| PO2: Speed in % <sup>1)</sup> | PI2: Current <sup>1)</sup> |
| PO3: Ramp                     | PI3: Status word 2         |

1) Parameterizable

The following abbreviations are used in the figure:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

### INFORMATION



Parameters can be set for PO2 and PI2 in combination with MOVIFIT® FC. This section describes the structure of the process data with factory setting. For further information, refer to chapter "Parameter list for the MOVIFIT® FC power section" (→ 185).

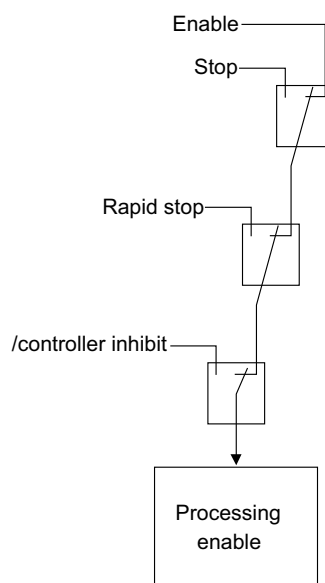
### 11.6.1 Assignment of MOVIFIT® FC control word

MOVIFIT® FC is controlled via the control word.

The MOVIFIT® FC control word is defined as follows:

| MOVIFIT® FC control word (2 bytes) |                                    |                                                                                                                                                                                 |
|------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                                | Meaning                            | Coding and function                                                                                                                                                             |
| 0                                  | Controller inhibit/enable          | 0 = Enable<br>1 = Inhibit controller, activate brake.                                                                                                                           |
| 1                                  | Enable/Rapid stop                  | 0 = Rapid stop<br>1 = Enable                                                                                                                                                    |
| 2                                  | Enable/stop                        | 0 = Stop at standard ramp<br>1 = Enable                                                                                                                                         |
| 3 – 4                              | –                                  | Reserved = 0                                                                                                                                                                    |
| 5                                  | Parameter set changeover           | 0 = Parameter set 1<br>1 = Parameter set 2                                                                                                                                      |
| 6                                  | Error reset                        | If there is a fault in the inverter power section, an error reset is requested by changing this bit from 0 to 1.                                                                |
| 7                                  | –                                  | Reserved = 0                                                                                                                                                                    |
| 8                                  | Brake release without drive enable | This function is not active in Easy mode. The function is activated by setting an additional parameter.<br>1 = Release brake without drive enable.<br>0 = Do not release brake. |
| 9 – 15                             | –                                  | Reserved = 0                                                                                                                                                                    |

The following prioritization applies to the evaluation of bits used for the enable in the control word:



9007200047677707

### 11.6.2 Coding of the speed setpoint

The speed setpoint is given as a relative value in percentage. It refers to the preset maximum speed in parameter P302, index 8517 (parameter set 1) and parameter P312, index 8521 (parameter set 2).

In Easy mode, the maximum speed is set to 3000 1/min as a default.

Coding:  $C000_{hex} = -100\%$  (counterclockwise direction)

$4000_{hex} = +100\%$  (clockwise direction)

1 digit = 0.0061%

Example:  $80\% n_{max}$  (counterclockwise rotation)

Calculation:  $-\frac{80\%}{0.0061} = -13115_{dec} = CCC5_{hex}$

### 11.6.3 Coding of the ramp

The current integrator ramp is transferred in process output data word PO3. The indicated time refers to a change in speed of 1500 1/min. Presetting the ramp via process data will deactivate parameters P130/P140 and P131/P141.

Coding: 1 digit = 1 ms

Range: 100 ms – 65 s

Example:  $2.0\text{ s} = 2000\text{ ms} = 2000_{dec} = 07D0_{hex}$

#### 11.6.4 Assignment of status word 1 for MOVIFIT® FC

Status word 1 is used to display the unit status and, in case of a fault, the respective fault number.

The MOVIFIT® FC status word 1 is defined as follows:

| MOVIFIT® FC status word 1 (2 bytes) |                                                                                           |                                                                                                                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                                 | Meaning                                                                                   | Coding and function                                                                                                                                   |
| 0                                   | Output stage enabled                                                                      | 1 = MOVIFIT® inverter output stage is enabled.<br>0 = MOVIFIT® inverter output stage is not enabled.                                                  |
| 1                                   | Inverter ready                                                                            | 1 = Inverter power section is ready for operation.<br>0 = Inverter power section is not ready for operation.                                          |
| 2                                   | PO data enabled                                                                           | 1 = Process data is enabled. The drive can be controlled via fieldbus.<br>0 = Process data is inhibited. The drive cannot be controlled via fieldbus. |
| 3                                   | –                                                                                         | Reserved = 0                                                                                                                                          |
| 4                                   | Current parameter set                                                                     | 0 = Parameter set 1<br>1 = Parameter set 2                                                                                                            |
| 5                                   | Failure/warning                                                                           | 1 = Failure/warning present.<br>0 = No failure/warning present.                                                                                       |
| 6 – 7                               | –                                                                                         | Reserved = 0                                                                                                                                          |
| 8 – 15                              | If no failure/warning is present (bit 5 = 0):<br>Unit state of the inverter power section | 0 = 24 V operation<br>1 = Controller inhibit<br>2 = No enable<br>3 = Standstill current<br>4 = Enable<br>18 = Manual mode active                      |
|                                     | If a failure/warning is present (bit 5 = 1):<br>Fault number                              | Fault number                                                                                                                                          |

#### 11.6.5 Coding of the current value

The power section returns the actual value of the output current as a relative value in percentage. The output current refers to the nominal unit current  $I_N$ .

Coding: 1 digit = 0.1%  $I_N$

Range: Signed 16 bit integer

Example:  $0320_{\text{hex}} = 800 \times 0.1\% I_N = 80\% I_N$



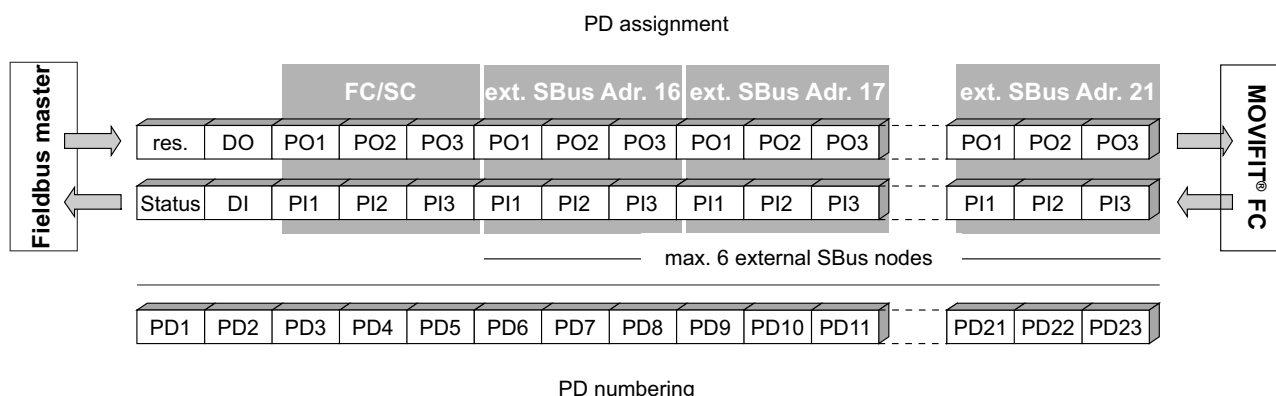
### 11.6.6 Assignment of status word 2 for MOVIFIT® FC

The digital input terminals DI100 – DI103 are only available with MOVIFIT® slave units that communicate via SBus with a central MOVIFIT® unit with fieldbus connection.

The MOVIFIT® FC status word 2 is defined as follows:

| MOVIFIT® FC status word 2 (2 bytes) |                                                                        |                                                                                                                                                       |
|-------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit                                 | Meaning                                                                | Coding and function                                                                                                                                   |
| 0                                   | Output stage enabled                                                   | 1 = MOVIFIT® inverter output stage is enabled.<br>0 = MOVIFIT® inverter output stage is not enabled.                                                  |
| 1                                   | Inverter ready                                                         | 1 = Inverter power section is ready for operation.<br>0 = Inverter power section is not ready for operation.                                          |
| 2                                   | PO data enabled                                                        | 1 = Process data is enabled. The drive can be controlled via fieldbus.<br>0 = Process data is inhibited. The drive cannot be controlled via fieldbus. |
| 3                                   | –                                                                      | Reserved = 0                                                                                                                                          |
| 4                                   | Current parameter set                                                  | 0 = Parameter set 1<br>1 = Parameter set 2                                                                                                            |
| 5                                   | Failure/warning                                                        | 1 = Failure/warning present.<br>0 = No failure/warning present.                                                                                       |
| 6 – 7                               | –                                                                      | Reserved = 0                                                                                                                                          |
| 8                                   | Brake                                                                  | 1 = Brake is applied.<br>0 = Brake is released.                                                                                                       |
| 9                                   | In operating mode as SBus slave: Input DI100<br>Otherwise: No function | 1 = Input DI100 is set.<br>0 = Input DI100 is not set.<br>Reserved = 0                                                                                |
| 10                                  | In operating mode as SBus slave: Input DI101<br>Otherwise: No function | 1 = Input DI101 is set.<br>0 = Input DI101 is not set.<br>Reserved = 0                                                                                |
| 11                                  | In operating mode as SBus slave: Input DI102<br>Otherwise: No function | 1 = Input DI102 is set.<br>0 = Input DI102 is not set.<br>Reserved = 0                                                                                |
| 12                                  | In operating mode as SBus slave: Input DI103<br>Otherwise: No function | 1 = Input DI103 is set.<br>0 = Input DI103 is not set.<br>Reserved = 0                                                                                |
| 13 – 15                             | –                                                                      | Reserved = 0                                                                                                                                          |

## 11.7 Process data between a MOVIFIT® slave and MOVIFIT® SC/FC



9007200223975563

The following abbreviations are used in the figure:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

## INFORMATION



- The process image of MOVIFIT® SC slaves corresponds to the MOVIFIT® SC process image. For further information, refer to chapter "Process data between the integrated motor starter and MOVIFIT® SC" (→ 127).
- The process image of MOVIFIT® FC slaves corresponds to the MOVIFIT® FC process image. For further information, refer to chapter "Process data between the integrated frequency inverter and MOVIFIT® FC" (→ 129).

## 12 Operation of MOVITOOLS® MotionStudio

### 12.1 Preparations at the MOVIFIT® unit

#### INFORMATION

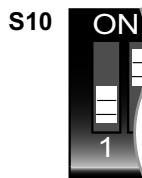


Always follow the safety and warning instructions in the relevant operating instructions when working on the MOVIFIT® unit.

During startup of the MOVIFIT® unit, you can perform expanded parameterization in Expert mode via fieldbus or diagnostic interface. You can use the MOVITOOLS® MotionStudio software to adjust the parameters to the application.

Proceed as follows to activate Expert mode:

1. Install the latest software version of MOVITOOLS® MotionStudio on your PC/laptop.
2. Activate the Expert mode for MOVIFIT® SC and MOVIFIT® FC by setting the DIP switch S10/1 to "ON".



9007200092341131

#### INFORMATION



If DIP switches S10/2 – S10/6 are set correctly for the application when activating the Expert mode, you do not have to perform a motor/brake startup with MOVITOOLS® MotionStudio.

## 12.2 About MOVITOOLS® MotionStudio

### 12.2.1 Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with units
- Executing functions of the units

### 12.2.2 Communication channels

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to 4 communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet TCP/IP, PROFINET IO, EtherNet/IP™, MODBUS TCP
- EtherCAT
- Fieldbus (PROFIBUS DP-V1)
- Non-proprietary software interface Tool Calling Interface

The available channels can vary depending on the unit and its communication options.

### 12.2.3 Functions with the units

The software package enables you to perform the following functions with consistency:

- Parameterization (e.g. in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are included in the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

MOVITOOLS® MotionStudio provides the right tools for every unit type.

## 12.3 First steps

### 12.3.1 Starting the software and creating a project

Proceed as follows:

1. Select the following item from the Windows start menu: [Start] / [Programs] / [SEW] / [MOVITOOLS MotionStudio] / [MOVITOOLS MotionStudio]  
⇒ MOVITOOLS® MotionStudio is started.
2. Create a project with a name and directory.

### 12.3.2 Establishing communication and scanning the network

Proceed as follows:

1. Set up a communication channel to communicate with your units.  
⇒ For detailed information on how to configure a communication channel and regarding the relevant communication type, refer to section "Communication via fieldbus/industrial Ethernet".
2. Scan your network (unit scan) via the icon [1] in the toolbar.



[1]

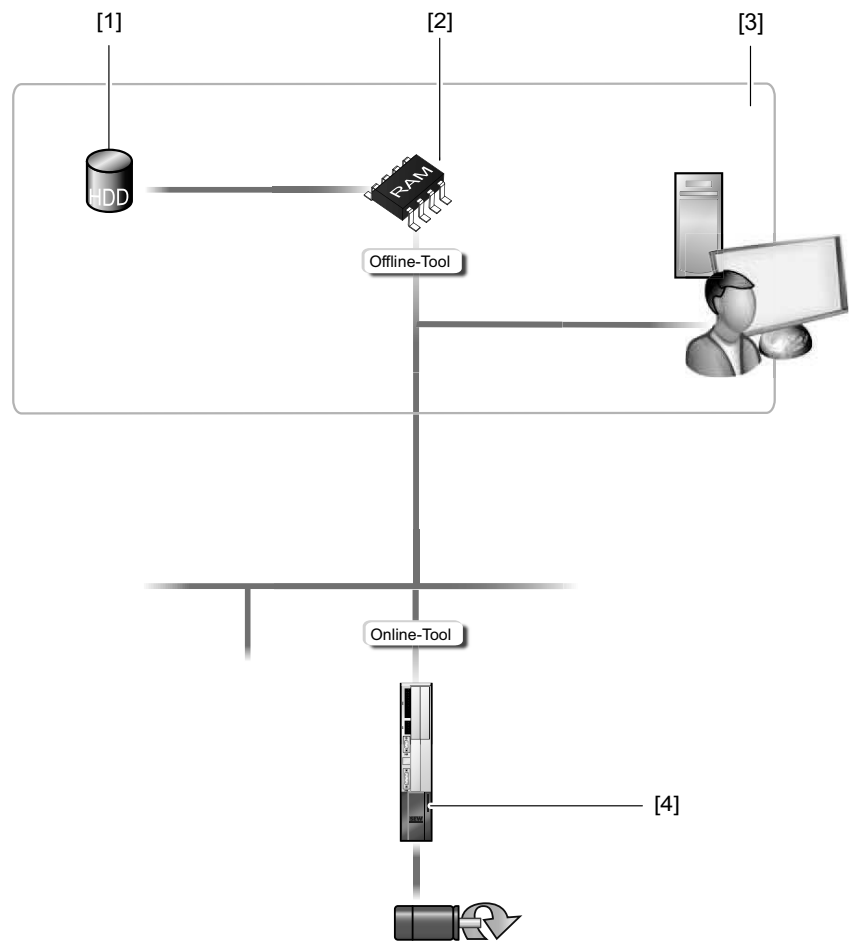
27021598896943499

### 12.3.3 Connection mode

#### Overview

MOVITOOLS® MotionStudio differentiates between "online" and "offline" connection mode. You determine the connection mode yourself. Depending on the selected connection mode, you can choose offline or online tools specific to your unit.

The following figure illustrates the two types of tools:



18014399752675211

- [1]

Hard drive of the engineering PC
- [2]

RAM of the engineering PC
- [3]

Engineering PC
- [4]

Unit

| Tools         | Description                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Online tools  | Changes made using online tools affect <b>"ONLY"</b> the unit [4]. <ul style="list-style-type: none"><li>Execute the "Upload (unit-&gt;PC)" function if you want to transfer the changes to your RAM [2].</li><li>Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3].</li></ul>                                                            |
| Offline tools | Changes made using offline tools affect <b>"ONLY"</b> the RAM [2] at first. <ul style="list-style-type: none"><li>Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3].</li><li>Execute the "Download (PC-&gt;unit)" function if you want to transfer the changes to your unit [4] as well. Check the parameterization afterwards.</li></ul> |

21361797/EN – 12/2015

## INFORMATION



The "online" connection status is **NOT** a response message which informs you that you are currently connected to the unit or that your unit is ready for communication.

- If you need this response message, pay attention to the section "Setting up the cyclic availability test" in the online help (or in the manual) of MOVITOOLS® MotionStudio.

## INFORMATION



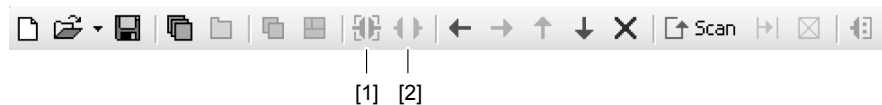
Project management commands (such as "download" and "upload"), the online unit status, and the "unit scan" work independently of the set connection mode.

MOVITOOLS® MotionStudio starts up in the connection mode that you set before you closed down.

### Selecting the communication mode (online or offline)

Proceed as follows:

1. Select the connection mode:
  - For functions (online tools) that should directly influence the unit, switch to online mode by using the icon [1].
  - For functions (offline tools) that should directly influence the unit, switch to offline mode by using the icon [2].



18014399643939211

2. Select the unit node.
3. Select the tools for configuring the unit from the context menu.

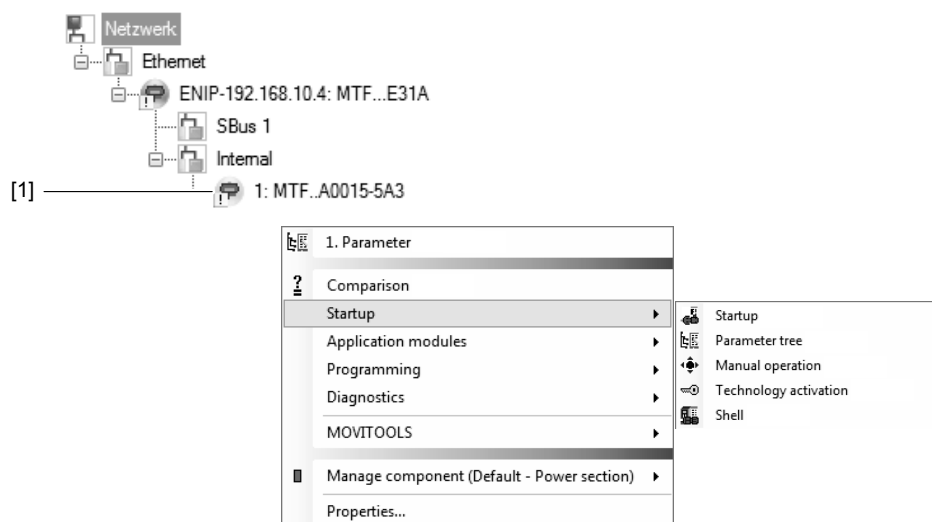
#### 12.3.4 Configuring units

The following example uses a MOVIFIT® unit to show how to display the tools for configuring the unit.

The connection mode is "online". The unit has been scanned in the network view.

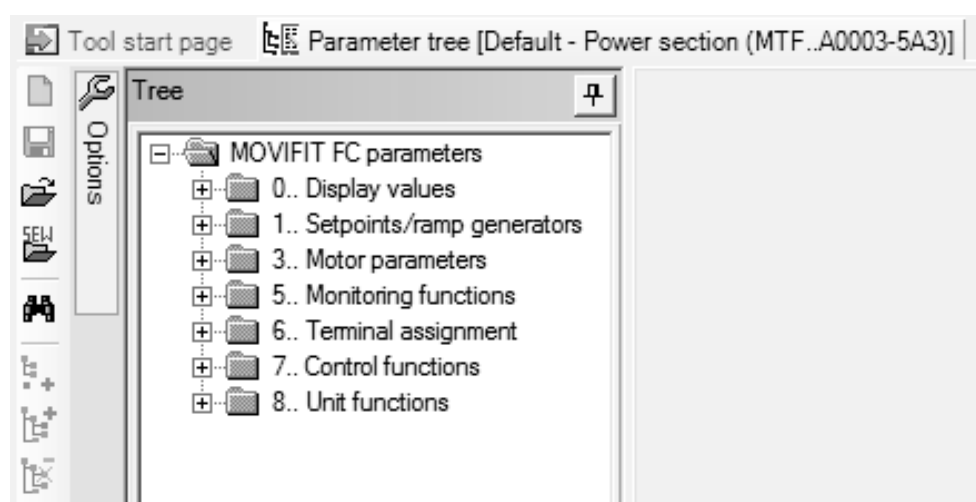
Proceed as follows:

1. Select the unit (in this example the power section [1]) in the network view.
2. Right-click to open the context menu.



9007201701091851

3. Select the tool for configuring the unit (in this example the command [Startup] > [Parameter tree]).



9007201701096203



## 12.4 Serial communication (RS485) via interface adapters

### 12.4.1 Engineering via interface adapter (serial)

As your unit supports the "serial" communication option, you can use an interface adapter for engineering.

The interface adapter is an additional hardware component for connecting your engineering PC/laptop with the respective communication option of the unit.

The USB11A interface adapter based on the RS485 interface standard is suitable for SEW-EURODRIVE units.

You can obtain the USB11A interface adapter from SEW-EURODRIVE:

| Order no. | Scope of delivery                                                                                                                                                                               |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 08248311  | 2 connection cables: <ul style="list-style-type: none"> <li>• TAE connection cable with two RJ10 connectors</li> <li>• USB connection cable with USB-A connector and USB-B connector</li> </ul> |

### 12.4.2 Startup of the USB11A interface adapter

The USB11A interface adapter uses a COM redirector. This assigns the first free COM port to the interface adapter.

#### Connecting the USB11A interface adapter



#### ▲ WARNING

Risk of burns due to hot surfaces of the MOVIFIT® unit or external options (e.g. braking resistor).

Severe injuries.

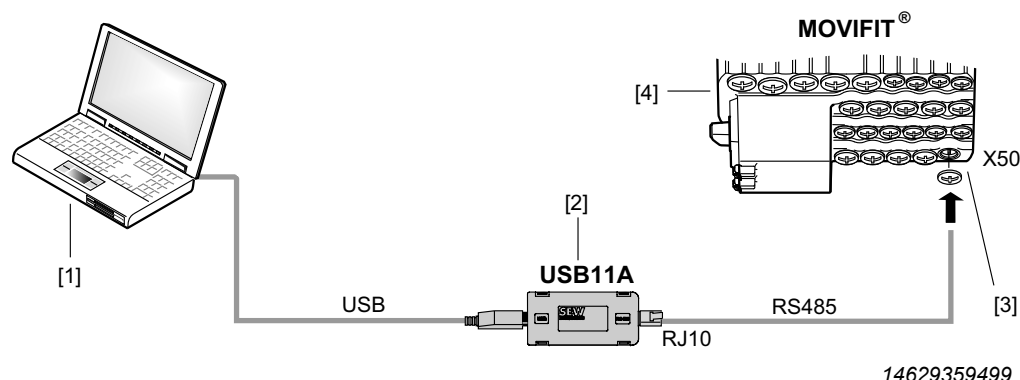
- Do not touch the MOVIFIT® unit and external options until they have cooled down sufficiently.



#### INFORMATION

In case of a connection with an interface adapter, you cannot load any application from the engineering PC to the unit.

The following figure shows how the USB11A interface adapter [2] is connected with the unit [4] and with the PC/laptop [1] via the diagnostic socket [3]. The X50 diagnostic interface of the MOVIFIT® unit is located at the ABOX under a screw plug.



- |                                                                     |                                   |
|---------------------------------------------------------------------|-----------------------------------|
| [1] PC/laptop                                                       | [3] Diagnostic socket of the unit |
| [2] USB11A with two connection cables<br>(included in the delivery) | [4] Unit                          |

Proceed as follows:

1. Remove the screw plug from the X50 diagnostic interface.
2. Connect the USB11A interface adapter [2] with the two connection cables provided:
  - Plug the RJ10 connector of the first connector cable into the diagnostics socket [3] of the unit [4].
  - Plug the USB-A connector of the second connection cable into a free USB port on your PC/laptop [1].
3. If you are operating the interface adapter with MOVITOOLS® MotionStudio for the first time, install the required driver.

### Installing the drivers

The drivers for the USB11A interface adapter are installed during installation of MOVITOOLS® MotionStudio.

Proceed as follows:

1. Make sure that you have local administrator rights on your PC/laptop.
2. Connect the USB11A interface adapter to a free USB port on your PC/laptop.
  - ⇒ Your PC will detect the new hardware and launch the hardware wizard.
  - ⇒ The interface adapter is ready for operation.

### Checking the COM port of the USB11A on the PC/laptop

Proceed as follows:

1. Select the following item from the Windows start menu on your PC/laptop: [Start] / [Settings] / [Control Panel] / [System].
2. Open the "Hardware" tab.
3. Click on the [Device manager] button.
4. Open the "Connections (COM and LPT)" folder.
  - ⇒ The virtual COM port assigned to the interface adapter is displayed (e.g. "USB Serial Port (COM3)").
5. To avoid conflicts with another COM port, change the COM port of the USB11A interface adapter:
  - Select the COM port of USB11A in the device manager.
  - In the context menu, click the [Properties] command and assign the USB11A to another COM port.
  - Restart your PC/laptop for the changes to become effective.

### 12.4.3 Configuring the serial communication

Proceed as follows:

- ✓ There is a serial connection between your PC/laptop and the units you want to configure via the USB11A interface adapter.

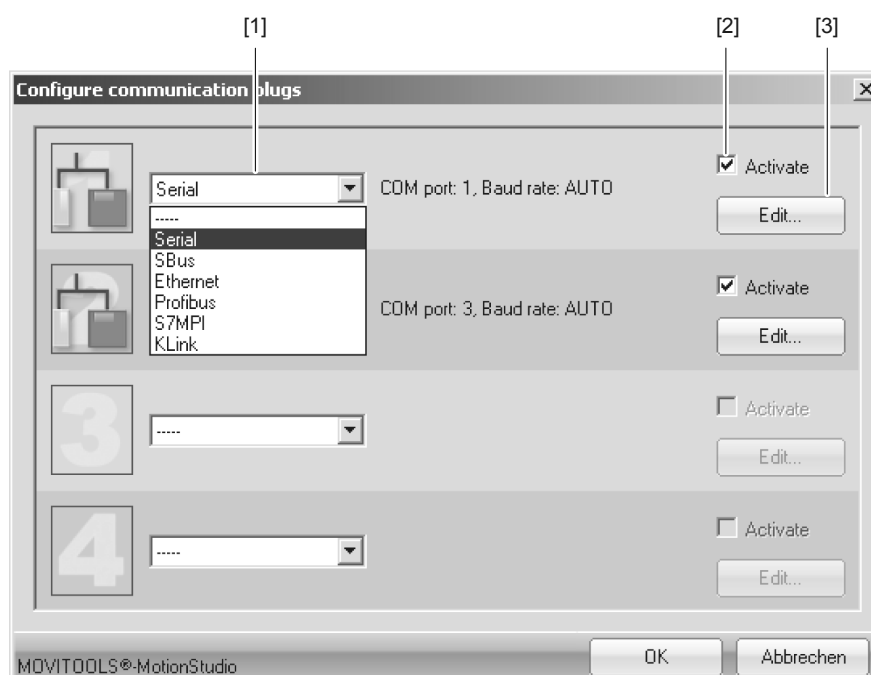
1. Click the icon [1] in the toolbar.



[1]

18014399642823819

⇒ The following window is displayed.



9007200201683979

2. From the list [1], select "Serial" as the communication type.

⇒ In the example, "Serial" is activated as the communication type for the first communication channel [2].

3. Click the button [3].  
⇒ This displays the settings for the communication type "Serial".



9007200201689739

4. It might be necessary to change the preset communication parameters on the tab pages "Basic settings" and "Extended settings". Refer to chapter "Serial communication parameter (RS485)" (→ 146) for a detailed description of the communication parameters.

## Serial communication parameter (RS485)

The following table describes the "Basic setting" for the serial (RS485) communication channel:

| Communication parameter | Description                                                                                                             | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COM port                | Serial port connected to the interface adapter.                                                                         | <ul style="list-style-type: none"> <li>If there is no value entered here, the SEW Communication Server uses the first available port.</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| Baud rate               | Transmission speed with which the connected PC communicates with the unit in the network via the communication channel. | <ul style="list-style-type: none"> <li>Possible values: <ul style="list-style-type: none"> <li>9.6 kBit/s</li> <li>57.6 kBit/s</li> <li>AUTO (default setting)</li> </ul> </li> <li>Find the correct value for the connected unit in the documentation.</li> <li>If you set "AUTO", the units are scanned with both baud rates in succession.</li> <li>Set the starting value for automatic baud rate detection under [Settings] &gt; [Options] &gt; [Communication].</li> </ul> |

The following table describes the "Extended setting" for the serial (RS485) communication channel:

| Communication parameter | Description                                                                                         | Information                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter telegrams     | Telegram with a single parameter                                                                    | Used to transfer a <b>single parameter</b> of a unit.                                                                                                                                                                                                                                                                                                                                                                                       |
| Multi-byte telegrams    | Telegram with several parameters                                                                    | Used to transfer the <b>complete</b> parameter set of a unit.                                                                                                                                                                                                                                                                                                                                                                               |
| Timeout                 | Waiting time in ms that the master waits for a response from the slave after it has made a request. | <ul style="list-style-type: none"> <li>Default setting: <ul style="list-style-type: none"> <li>100 ms (parameter telegram)</li> <li>350 ms (multi-byte telegram)</li> </ul> </li> <li>If not all units are detected during a network scan or communication problems occur, increase the values as follows: <ul style="list-style-type: none"> <li>300 ms (parameter telegram)</li> <li>1000 ms (multi-byte telegram)</li> </ul> </li> </ul> |
| Retries                 | Number of request retries after the timeout is exceeded                                             | Default setting: 3                                                                                                                                                                                                                                                                                                                                                                                                                          |

### Setting the serial interface for MOVIFIT® MC

If not all the MOVIMOT® inverters are detected in connection with MOVIFIT® MC, SEW-EURODRIVE recommends the following communication parameters for the serial interface:

| Group                | Communication parameter | Value   |
|----------------------|-------------------------|---------|
| Parameter telegrams  | Timeout                 | 350 ms  |
|                      | Retries                 | 3       |
| Multi-byte telegrams | Timeout                 | 3500 ms |
|                      | Retries                 | 1       |

## 12.5 Communication via Ethernet

### 12.5.1 Connecting the service interface of the MOVIFIT® unit to the PC/laptop

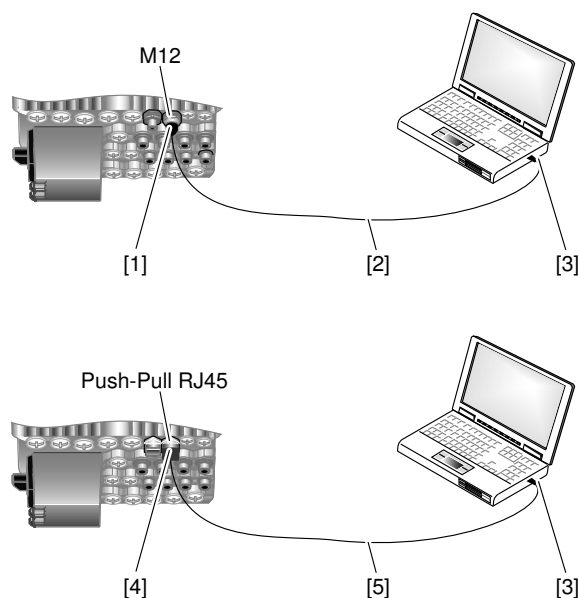
#### NOTICE

The RJ45 socket can be damaged when inserting commercially available RJ45 patch cables without push-pull connector housing.

Damage to the push-pull RJ45 socket.

- Only plug suitable push-pull RJ45 mating connectors according to IEC 61076-3-117 into push-pull RJ45 sockets.
- Never use commercially available RJ45 patch cables without push-pull connector housing. These plug connectors do not snap in place when they are plugged.

The following figure shows the connection between a PC/laptop and the engineering interface of the MOVIFIT® unit:



1654212363

- |                                                  |                                                     |
|--------------------------------------------------|-----------------------------------------------------|
| [1] Interface (M12) of the MOVIFIT® unit         | [2] Commercially available Ethernet cable           |
| [3] Ethernet interface of the PC/laptop          | [4] Interface (push-pull-RJ45) of the MOVIFIT® unit |
| [5] Ethernet cable with push-pull RJ45 connector |                                                     |



### 12.5.2 Address Editor

#### Overview

Address Editor is a free software tool from SEW-EURODRIVE. It is available once the "MOVITOOLS® MotionStudio" engineering software is installed. However, it is used separately.

You can use Address Editor to establish communication with your units via Ethernet and to address the units.

If you use a patch cable to connect the Ethernet interface of your engineering PC to the Ethernet, the Address Editor detects all Ethernet nodes in the connected network segment (local network).

In contrast to "MOVITOOLS® MotionStudio", you do **not** need to set the IP address of the engineering PC to the local network.

Perform the following process steps after you have added Ethernet nodes to a network:

1. "Starting the Address Editor" (→  149)
2. "Searching Ethernet nodes" (→  150)
3. Once you have found the added Ethernet nodes, you have two options:
  - ⇒ "Setting the detected Ethernet nodes according to the network (addressing)" (→  151)
  - ⇒ "Setting the engineering PC appropriately for the network" (→  151)

#### Starting the Address Editor

You can use Address Editor immediately after installing MOVITOOLS® MotionStudio.

Proceed as follows:

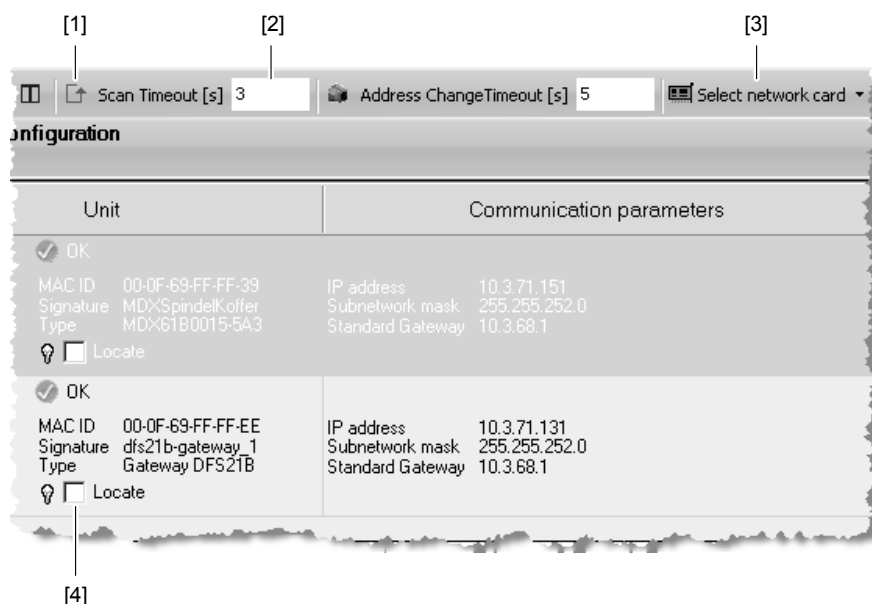
1. Close MOVITOOLS® MotionStudio.
2. Select the following item from the Windows start menu: [Start] / [Programs] / [SEW] / [MOVITOOLS MotionStudio] / [Address Editor]

### Searching Ethernet nodes

You can use the Address Editor to find Ethernet nodes in a network. It can also be used for detecting new Ethernet nodes. The Address Editor also helps you locate the Ethernet interface of detected Ethernet nodes.

Proceed as follows:

1. Start the Address Editor.
2. Select "Ethernet" as the interface for PC and unit. To do so, activate the appropriate radio button.
3. Click [Next] to continue.
4. Wait until the network scan starts **automatically**. The default setting for the waiting time is 3 s (edit box [2]).
  - ⇒ The current addresses of all Ethernet nodes in the connected network will be displayed.
5. If no units are detected during the network scan, check the wiring or if you have installed (activated) several network cards in your PC.
6. Proceed as follows to search the units with a specific network card:
  - Select the required card. To do so, click the icon [3] in the toolbar.
  - Start the network scan **manually**. To do so, click the icon [1] in the toolbar.



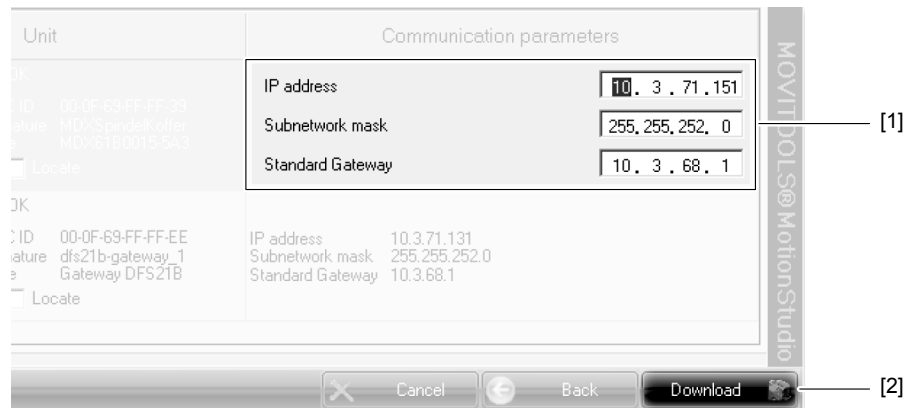
18014400023008779

7. Activate the check box [4] to localize an Ethernet node.
  - ⇒ The "link/act" LED of the first Ethernet interface of the respective Ethernet node will flash green.

### Setting the detected Ethernet nodes according to the network (addressing)

Proceed as follows:

1. Start the Address Editor and scan the network.
2. Double-click in the area behind the setting [1] you want to change. You can change the following settings:
  - IP address of the node
  - IP address of the subnetwork mask
  - IP address of the standard gateway



18014400041285899

3. Press the enter key to confirm your changes.
4. To transfer the address changes to the Ethernet node, click the icon [2].
5. For the changed settings to become effective, switch off the unit and restart it afterwards.

### 12.5.3 Setting the engineering PC appropriately for the network

Proceed as follows:

1. From the Windows start menu, choose Control Panel and "Network and Internet" ("Network and Sharing Center" in the classic view).
2. Click [Manage network connection].
  - ⇒ A list opens with all existing network connections.
3. Select the respective network connection.
4. Choose the command [Properties] from the context menu.
5. Select the internet protocol "IPv4".
6. Click on the [Properties] button.
7. For the subnet mask and standard gateway, enter the same IP addresses that are used for the other Ethernet nodes in this local network.
8. For the engineering PC, enter an IP address that meets the following conditions:
  - In the group that defines the **network**, the address segment for the engineering PC must correspond to that of the other Ethernet nodes.
  - In the group that defines the **node**, the address segment for the engineering PC must differ from the other nodes.
  - The last group must not contain the values "0", "4", "127" and "255".

## INFORMATION



In the IP address of the subnet mask (such as 255.255.255.0), the values in the groups have the following meaning:

- "255" defines the address of the network where the stations are located.
- "0", defines the address of the actual node to distinguish it from other nodes.

9. Confirm with [OK].

10. Click [OK] again to close the window.

### 12.5.4 Configuring the communication channel via Ethernet

Proceed as follows:

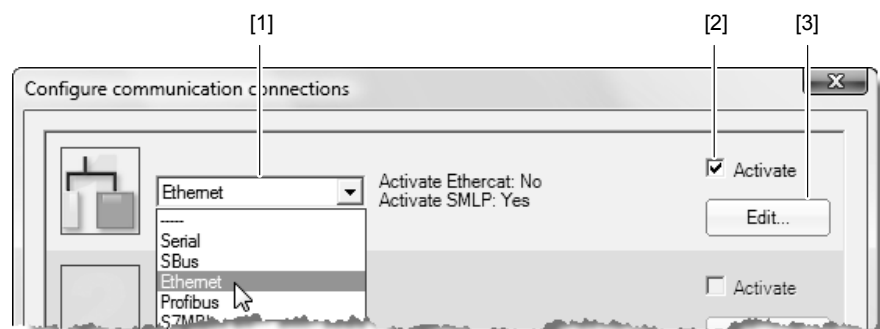
1. Click the icon [1] in the toolbar.



[1]

18014399642823819

⇒ This opens the "Configure communication connections" window.



27021598908604299

2. From the drop-down list [1], select "Ethernet" as the communication type.
  - ⇒ In the example, "Ethernet" is activated as the communication type for the first communication channel [2].
3. Click the button [3].
  - ⇒ This displays the settings for the communication type "Ethernet".
4. Set up the SMLP protocol in the "SMLP settings" tab. **SMLP** stands for **Simple MOVILINK®** Protocol. This is the SEW-EURODRIVE unit protocol and is transmitted directly via TCP/IP.
5. Set the parameters. Proceed as described in chapter "Setting communication parameters for SMLP" (→ 153).

## Setting communication parameters for SMLP

Proceed as follows:

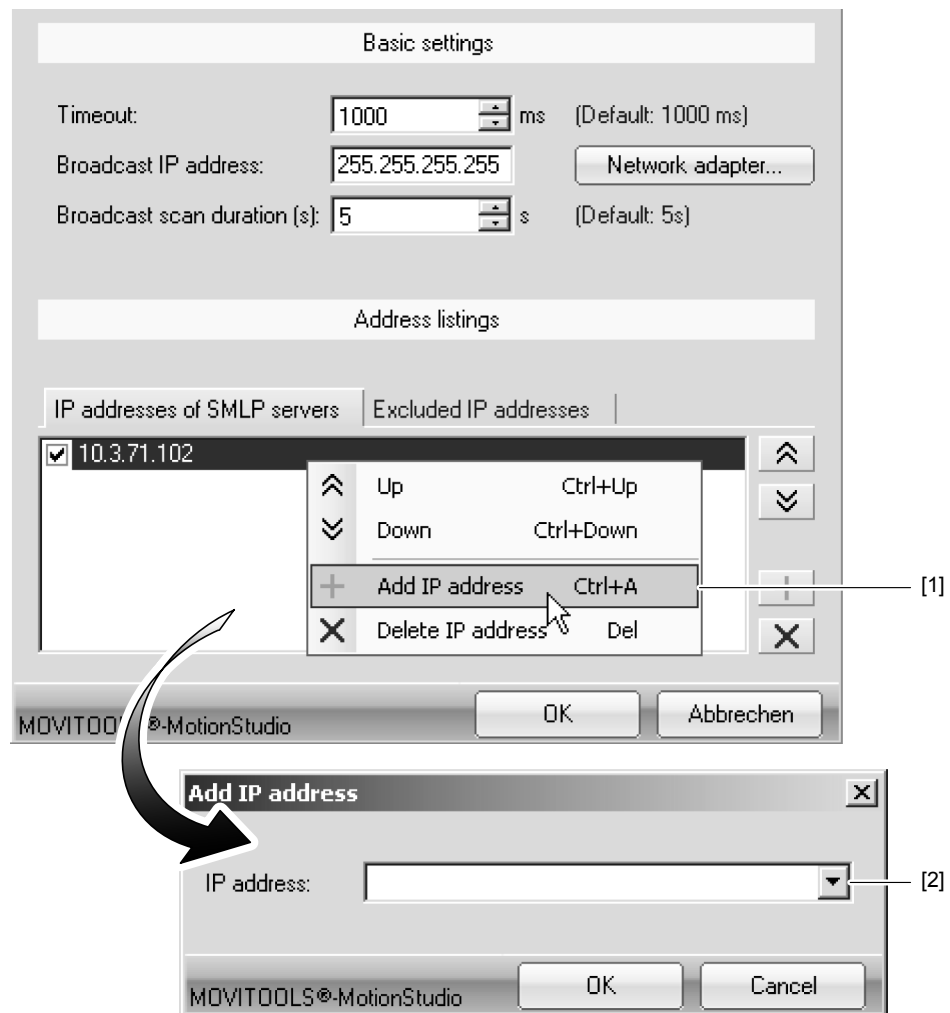
1. Change the set communication parameters if necessary. A detailed description of the communication parameters is available in the chapters "Communication parameters for SMLP" (→ 154) and "Communication ports used" (→ 155).

## INFORMATION



During a unit scan, the system recognizes only units that are in the same (local) network segment as the PC/laptop that is running MOVITOOLS® MotionStudio.

2. If you have units that are outside the local network segment, add the IP addresses of these units to the list of SMLP servers. Proceed as follows:
  - Select the address list.
  - Select the [Add IP address] [1] command from the context menu.



- Enter the IP address in the input field [2] and click the [OK] button.

## Communication parameters for SMLP

The following table shows the communication parameters for SMLP:

| Communication parameter | Description                                                                                                                                | Information                                                                                                                                                                                                                                                                                               |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timeout                 | Waiting time in ms that the client waits for a reply from the server after it has made a request.                                          | <ul style="list-style-type: none"> <li>• Default setting: 1000 ms</li> <li>• If a delay of the communication causes failure, increase the value.</li> </ul>                                                                                                                                               |
| Broadcast IP address    | IP address of the local network segment <b>within</b> which the unit scan is carried out.                                                  | In the default setting, the unit scan only retrieves units in the local network segment.                                                                                                                                                                                                                  |
| IP address SMLP server  | IP address of the SMLP server or of other units that are to be included in the unit scan but are <b>outside</b> the local network segment. | <ul style="list-style-type: none"> <li>• Enter the IP address of units that are to be included in the unit scan but are <b>outside</b> the local network segment.</li> <li>• If you are operating an indirect communication from Ethernet to PROFIBUS, enter the IP address of the controller.</li> </ul> |
| Excluded IP address     | IP addresses of units that should <b>not</b> be included in the unit scan.                                                                 | Enter the IP address of units that should <b>not</b> be included in the unit scan. This can be units that are not ready for communication (e.g. because they have not been started up yet).                                                                                                               |

**Communication ports used**

The following table shows the communication ports that MOVITOOLS® MotionStudio uses:

| Application                         | No. of the communication port | Description                                                                                           |
|-------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------|
| ETH server                          | 300 (TCP/UDP)                 | For the services of the SMLP and for using a PC as Ethernet gateway                                   |
| SEW communication server            | 301 (TCP)                     | For communication between MOVITOOLS® MotionStudio and the SEW communication server                    |
| Offline data server                 | 302 (TCP)                     | For communication of MOVITOOLS® MotionStudio in off-line mode                                         |
| MOVIVISION® server                  | 303 (TCP)                     | For communication with a PC with active MOVIVISION® server                                            |
| Reserved                            | 304                           | –                                                                                                     |
| TCI server                          | 305 (TCP)                     | For communication via TCI (Tool Calling Interface by Siemens)                                         |
| EcEngineeringServer-RemoteControl   | 306 (UDP)                     | For direct communication (without master) with the slaves                                             |
| EcEngineeringServer-Mailbox-Gateway | 307 (UDP)                     | For direct communication (without master) with the slaves and for communication via a mailbox gateway |
| MOVI-PLC® visualization             | 308 (TCP/UDP)                 | For communication between MOVI-PLC® and the 3D simulation of MOVITOOLS® MotionStudio                  |

## 12.6 Executing functions with the units

### 12.6.1 Reading or changing unit parameters

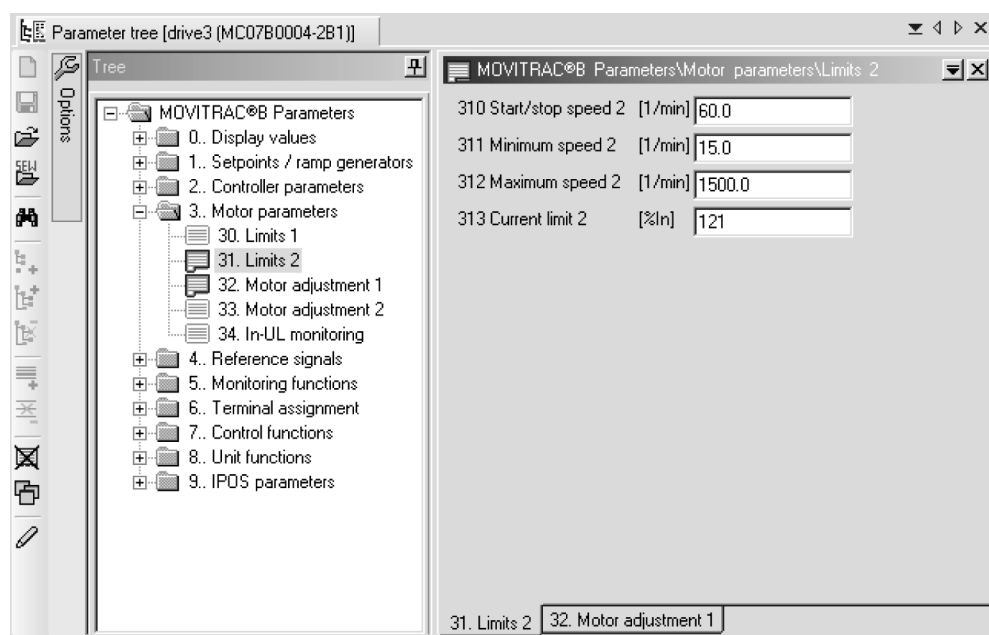
Proceed as follows:

1. Switch to the required view (project view or network view).
2. Select the connection mode:
  - If you want to read/change parameters directly on the **unit**, switch to online mode by using the icon [1].
  - If you want to read/change parameters in the **project**, switch to offline mode by using the icon [2].



18014399643939211

3. Select the unit you want to parameterize.
4. Choose the command [Startup] > [Parameter tree] from the context menu.
  - ⇒ This opens the "Parameter tree" view on the right section of the screen.
5. Expand the parameter tree to the node you require.



9007200201958155

6. To display a specific group of device parameters, double-click on the group.
7. Press the enter key to finalize any changes you make to numerical values in the input fields.

## INFORMATION



For detailed information about the unit parameters, refer to the parameter list for the unit.



### 12.6.2 Starting up units (online)

Proceed as follows:

1. Switch to the network view.
2. Switch to online mode by using the icon [1].



[1]

18014399693512203

3. Select the unit you want to startup.
4. Choose the command [Startup] > [Startup] from the context menu.
  - ⇒ The startup assistant is displayed.
5. Follow the instructions of the startup wizard and then load the startup data into your unit.

### 12.6.3 Configuration and diagnostics in transparent mode

There are plug-ins for configuration and diagnostics for the SEW-EURODRIVE application modules (see chapter "Configuration in transparent mode" (→ 208)).

## 13 Parameterizing the power section

### 13.1 Motor/brake startup with MOVIFIT® SC

The motor/brake startup is only available when Expert mode is activated. Activate the "Expert mode" for MOVIFIT® SC by setting the DIP switch S10/1 to "ON".

You can adjust the parameters for MOVIFIT® SC. The following parameters must be set to ensure successful startup:

- Parameter 200 – *Nominal line voltage*
- Parameter 620/621 – *Digital outputs DB00 and DB01*
- Parameter 700 – *Start operating mode*
- Parameter 736 – *Rated brake voltage drive 1*
- Parameter 737 – *Rated brake voltage drive 2*

All other parameters are described in detail in the chapters "Parameter list for the MOVIFIT® SC power section" and "Parameter description for MOVIFIT® SC".

### INFORMATION



For information on startup in "Easy mode" using DIP switches, see the "MOVIFIT® SC" operating instructions.

#### 13.1.1 Parameter 200 – Nominal line voltage

Adapts the unit to the nominal input voltage of the supplying system.

Choose the setting 400 V when the supply system supplies the voltage 3 x AC 380 V, 3 x AC 400 V or 3 x AC 415 V.

Choose the setting 480 V when the supply system supplies the voltage 3 x AC 460 V, 3 x AC 500 V or 3 x AC 500 V.

## 13.1.2 Parameter 620/621 – Digital outputs DB00/DB01

**▲ WARNING**

Unexpected plant behavior if the digital outputs DB00 or DB01 are used for controlling the brake and parameters are incorrectly set.

Fatal or severe injuries and damage to property.

- If the DB00 and DB01 digital outputs are used for controlling the brake, set parameter *P620/621* to "brake released" and make sure that the parameter setting will not be changed again.
- Before you use digital outputs to control the brake, check the parameter settings.

| Setting                | "0" signal            | "1" signal             |
|------------------------|-----------------------|------------------------|
| 0: No function         | –                     | –                      |
| 1: Fault drive 1       | No malfunction        | Fault drive 1          |
| 2: Fault drive 2       | No malfunction        | Fault drive 2          |
| 3: Ready for operation | Not ready             | Ready for operation    |
| 4: Drive 1 ON          | Drive 1 not enabled   | Drive 1 enabled        |
| 5: Drive 2 ON          | Drive 2 not enabled   | Drive 2 enabled        |
| 6: Brake 1 released    | Brake drive 1 applied | Brake drive 1 released |
| 7: Brake 2 released    | Brake drive 2 applied | Brake drive 2 released |

## 13.1.3 Parameter 700 – Operating mode

**▲ WARNING**

Unexpected plant behavior due to incorrect connection. Incorrect connection will cause incorrect motor rotation and/or uncontrolled motor startup.

Fatal or severe injuries and damage to property.

- Check the wiring according to the operating instructions prior to starting the motor.

The unit offers you the option of controlling up to 2 drives separately. If drives are used with a brake control via 2 coils from SEW-EURODRIVE, the brakes are also controlled separately via the MOVIFIT® unit.

**Single-motor operation****▲ WARNING**

Unexpected plant behavior due to incorrect connection. Do not connect the X9 and X91 terminals or the X9 plug connector in single-motor operation.

Fatal or severe injuries and damage to property.

- Use only the X8 and X81 terminals or the X8 plug connector in single-motor operation.

In the single-motor operation mode, the motor connected at terminal X8 can be run "clockwise" and "counterclockwise".

If a brakemotor with brake control via 2 coils from SEW-EURODRIVE is used, the brake must be connected to X8.

If the current measured at the output for drive 2 in single-motor operation mode exceeds a value of 10% of the nominal motor current  $I_N$ , the unit switches off and locks.

**Dual-motor operation**

In the dual-motor operation mode, drive 1 connected at X8 and drive 2 connected at X9 can be run independently of one another in one direction of rotation.

If brakemotors with brake control via 2 coils from SEW-EURODRIVE are used, the brakes must be connected as follows:

- Brake of drive 1 at X8
- Brake of drive 2 at X9

**13.1.4 Parameter 736/737 – Rated brake voltage drive 1/2**

If a brake with brake control via 2 coils from SEW-EURODRIVE is connected to X8/X9, this parameter is used to adapt the unit to the nominal voltage of the brake used at the drive 1/2.

When ordering the motor and the brake, make sure that the rated brake voltage and the nominal line voltage match.

## 13.2 Motor/brake startup with MOVIFIT® FC

The motor/brake startup is only available when Expert mode is activated. Activate the Expert mode for MOVIFIT® FC by setting the DIP switch S10/1 to "ON".

### INFORMATION



For information on startup in Easy mode using DIP switches, see the "MOVIFIT® SC" operating instructions.

Proceed as follows:

1. In the network view of MOVITOOLS® MotionStudio, select the unit.
2. Choose the command [Startup] > [Startup] from the context menu.
  - ⇒ The startup assistant is displayed. Follow the instructions of the startup assistant. You can switch between the dialogs by using the [Back] and [Next] buttons.



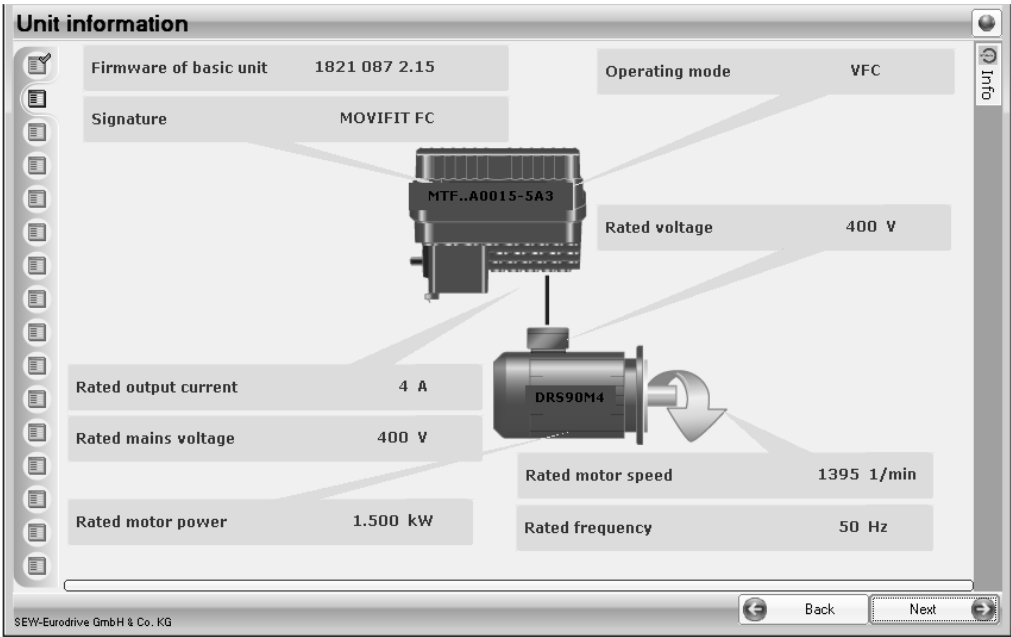
18014399302425355

13

Parameterizing the power section

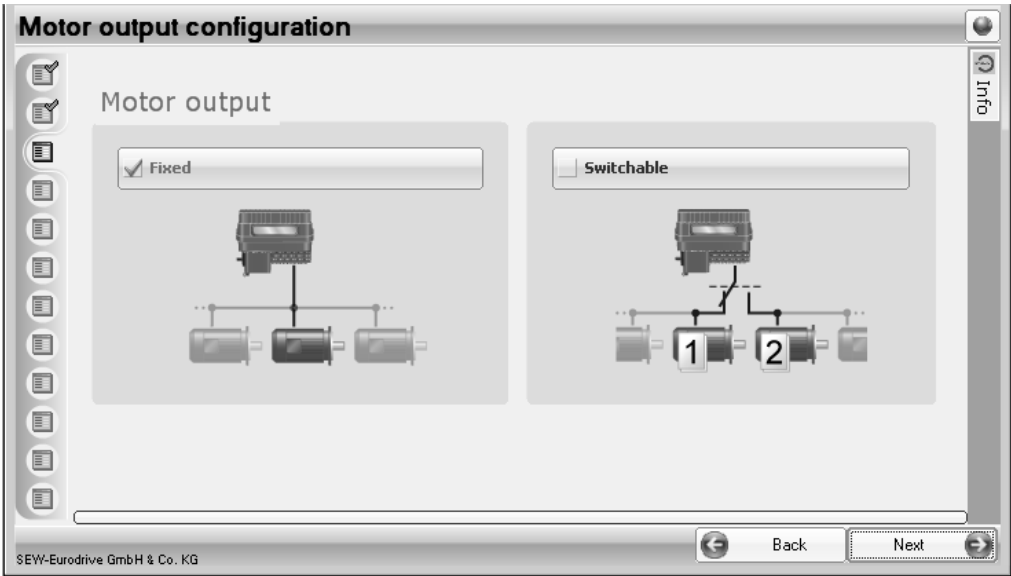
Motor/brake startup with MOVIFIT® FC

3. Select the parameter set for which startup should be performed.
- ⇒ An overview of the current unit information (only display values) are shown.



18014399302427019

4. Select the configuration of the motor output.



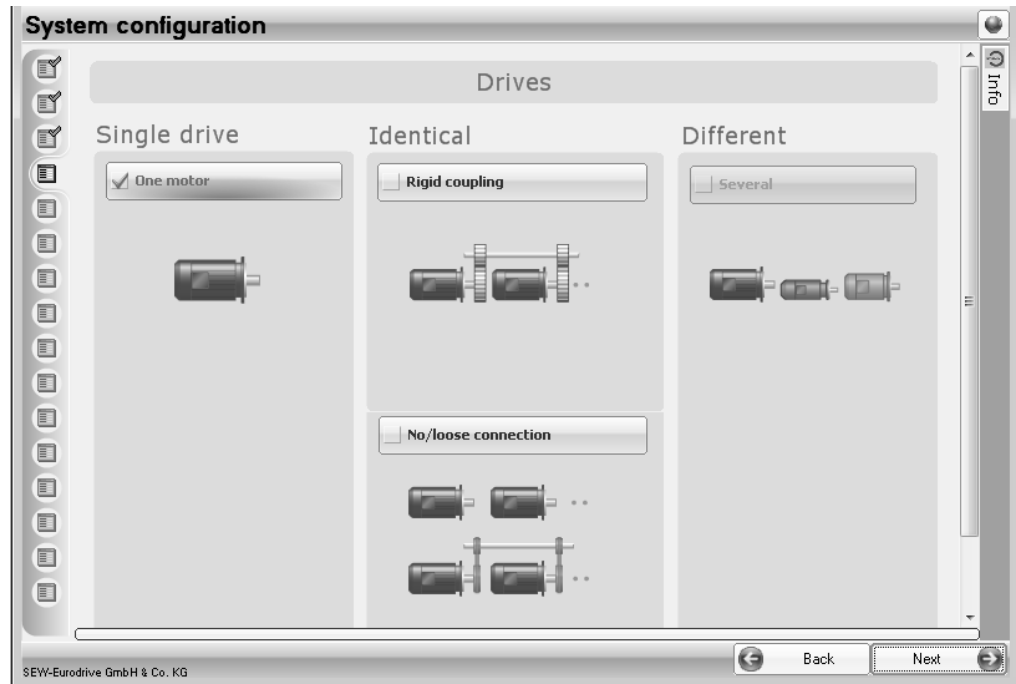
18014399302428683

| Setting    | Description                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Fixed      | The fixed connection of the motors to MOVIFIT® FC is the standard configuration.                                                  |
| Switchable | The switchable connection of motors to MOVIFIT® FC is only available for special designs with dual-motor operation. <sup>1)</sup> |

1) For more information on the MOVIFIT® special design for dual-motor operation, refer to the "MOVIFIT® FC special design for dual-motor operation" operating instructions.

21361797/EN – 12/2015

## 5. Select the system configuration.



9007200047689355

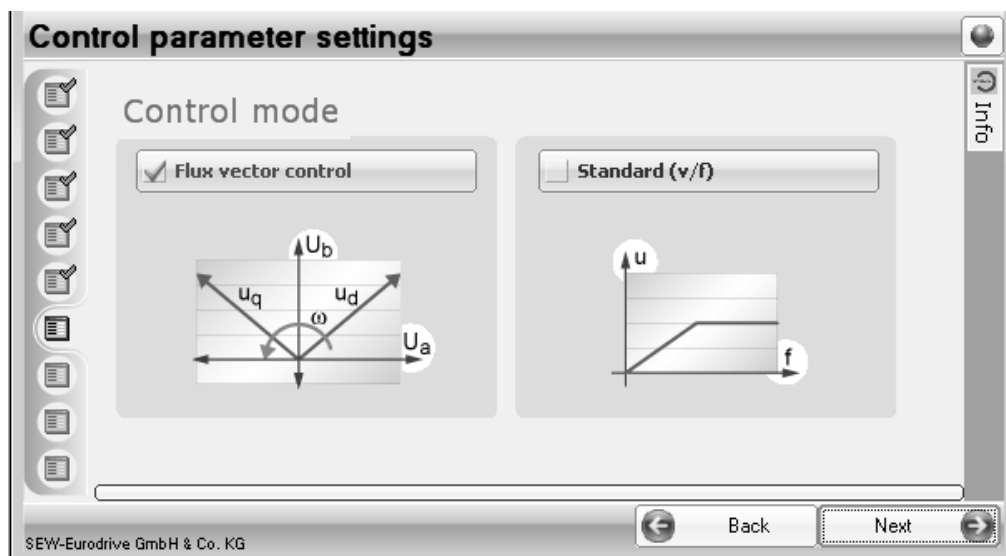
| Setting      | Description                                                                                                                                |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Single drive | When selecting "one motor", MOVIFIT® FC controls one single motor (default setting).                                                       |
| Identical    | When selecting "rigid coupling", MOVIFIT® FC controls several motors with the same power with rigidly coupled axes. <sup>1)</sup>          |
|              | When selecting "no/loose connection", MOVIFIT® FC controls several motors with the same power but with loose or no coupling. <sup>1)</sup> |
| Different    | This cannot be selected for the MOVIFIT® unit.                                                                                             |

1) If you select this, you have to select the alternative brake control "via constant voltage" in the "brake" dialog.

# 13 Parameterizing the power section

Motor/brake startup with MOVIFIT® FC

6. Select the control mode.



9007200047691019

| Setting             | Description                                                                                                                     |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Flux vector control | The vector-controlled operating mode (VFC) is adapted for use with SEW-EURODRIVE motors.                                        |
| Standard (v/f)      | You can select the control mode V/f characteristic curve for non-SEW motors if VFC control does not lead to sufficient results. |

7. Select the operating mode.



18014399302435339

21361797/EN – 12/2015



**▲ WARNING**

Danger of fatal injury if the hoist falls.

Severe or fatal injuries.

- You must always set the operating mode to "Hoist" when using lifting applications.
- The MOVIFIT® unit is not designed for use as a safety device in lifting applications.
- Use monitoring systems or mechanical protection devices to ensure safety.

| Setting               | Description                                                                                                                                                                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Speed control         | The speed is preset by the MOVIFIT® unit.                                                                                                                                                                                                                                       |
| DC braking            | The operating mode "DC braking" is used to decelerate a drive without giving off regenerative energy to a connected brake coil from SEW-EURODRIVE or a braking resistor. In this mode, the energy released during the braking process is converted to heat losses in the motor. |
| Hoist                 | This can only be selected for VFC control.                                                                                                                                                                                                                                      |
| Flying start function | This cannot be selected for the MOVIFIT® unit.                                                                                                                                                                                                                                  |

8. Select the type of the connected motor.

**Motor type**

Standard motors

DR DT DV DAS ED DZ DX

DRS DRE DRP DRN IEC CSA NEMA JEC BRASIL

Explosion-proof standard motors

EX IEC SP

EDR: ATEX EDR: IEC-EX EDR: Hazloc-NA

DR...J synchronous motors (LSPM technology)

LSPM

DRE J DRP J DRU J

Non-SEW motors

Measure

SEW-Eurodrive GmbH & Co. KG

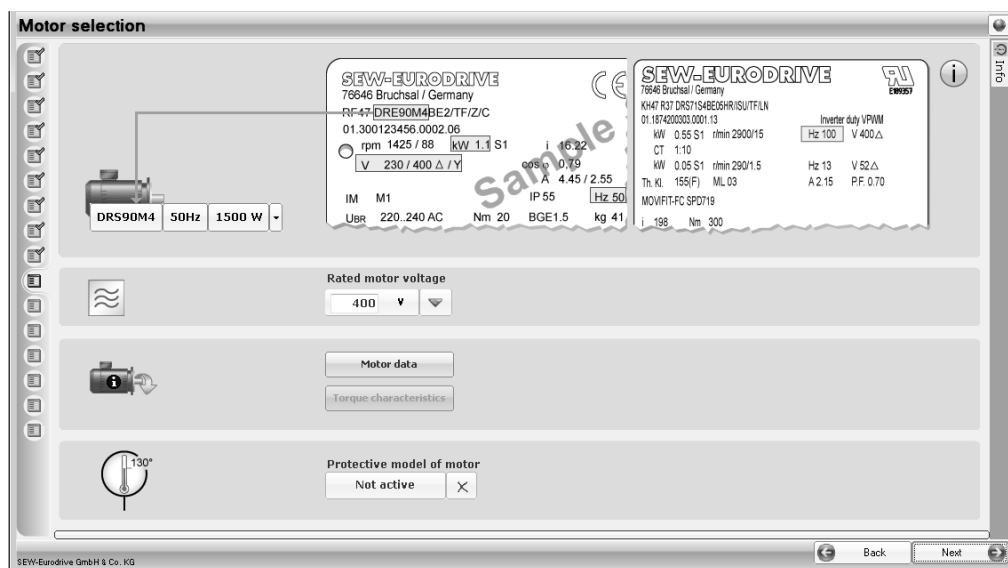
Back Next

27021598557174667

| Setting         | Description                       |
|-----------------|-----------------------------------|
| Standard motors | Standard motor from SEW-EURODRIVE |

| Setting                         | Description                                                                  |
|---------------------------------|------------------------------------------------------------------------------|
| Explosion-proof standard motors | Standard motor from SEW-EURODRIVE for potentially explosive atmospheres      |
| Synchronous motors              | This cannot be selected for the MOVIFIT® unit.                               |
| Third-party motors              | To determine all required motor data, third-party motors must be calibrated. |

9. If you select a standard motor or explosion-proof standard motor from SEW-EURODRIVE, enter the motor data.



27021598557177995

| Setting               | Description                                                                          |
|-----------------------|--------------------------------------------------------------------------------------|
| Motor type            | You find the corresponding data on the nameplate of the motor.                       |
| Rated motor frequency |                                                                                      |
| Nominal motor power   |                                                                                      |
| Nominal motor voltage |                                                                                      |
| Motor protection      | For standard motors, enter the data of thermal motor protection function optionally. |

10. When selecting a third-party motor, enter the additional motor data.

**Non-SEW motor**

**Motor data**

|                       |       |       |
|-----------------------|-------|-------|
| Rated speed           | 1395  | 1/min |
| Rated motor power     | 1.500 | kW    |
| cos(phi)              | 0.82  |       |
| Rated motor voltage   | 400   | V     |
| Rated motor current   | 3.290 | A     |
| Rated motor frequency | 50    | Hz    |
| Rated output current  | 4     | A     |

**Calibration process**



SEW-Eurodrive GmbH & Co. KG

Back Next

Info

Typ XYZN4/234/TF/AV1Y 3~ IEC 34  
Nr. 013210064101000201 i :1  
r/min 1380 Nm  
kW 0.75 S1 cosφ 0.73  
V 230Δ/400 A 3.65/2.10 Hz 50  
IM B3 kg 15.670 IP 54 Iso.Kl. F  
Brems V230AC Nm10 Gleichrichter BG1.5  
Made in Germany 181 068 6.13

18014399302438667

**⚠ WARNING**



Danger of electric shock due to energized motor during calibration procedure.  
Severe or fatal injuries.

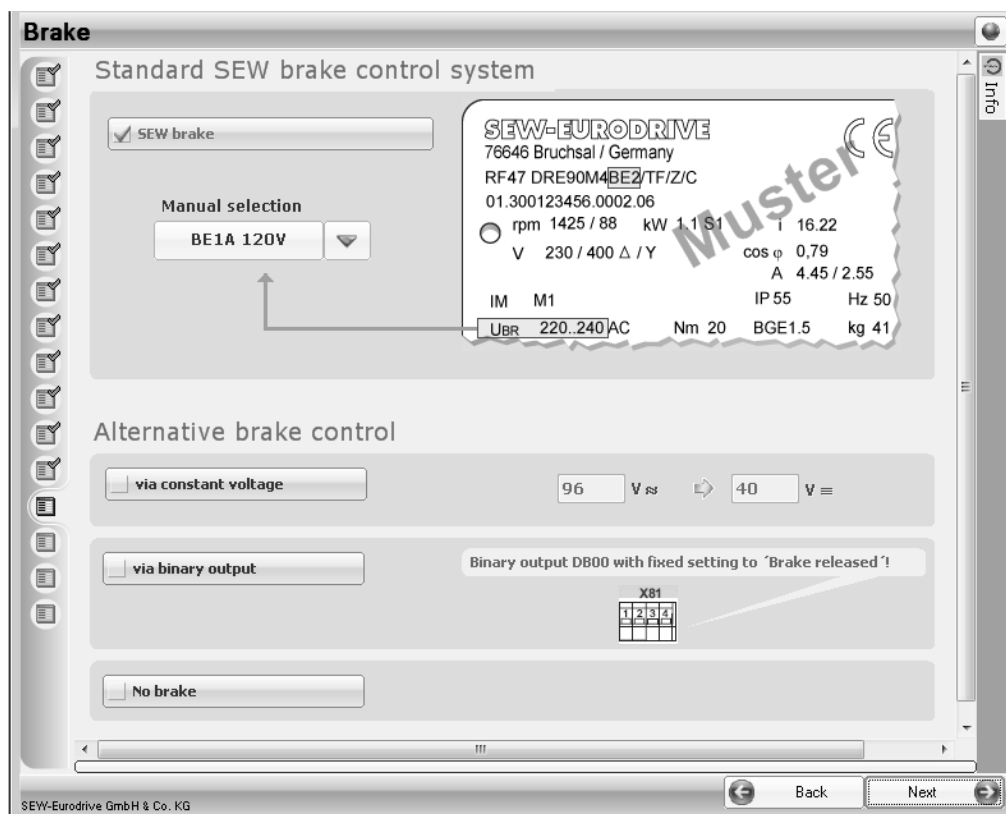
- Make sure that the connection box of the connected motor is closed during calibration.

| Setting                | Description                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal speed          | You find the corresponding data on the nameplate of the motor.                                                                                                                                                                                                                        |
| Nominal motor power    |                                                                                                                                                                                                                                                                                       |
| cos (phi)              |                                                                                                                                                                                                                                                                                       |
| Nominal motor voltage  |                                                                                                                                                                                                                                                                                       |
| Nominal motor current  |                                                                                                                                                                                                                                                                                       |
| Rated motor frequency  |                                                                                                                                                                                                                                                                                       |
| Nominal output current |                                                                                                                                                                                                                                                                                       |
| Calibration process    | Proceed as follows to determine the motor parameters:<br>1. Check that <ul style="list-style-type: none"><li>• The motor is connected</li><li>• The line voltage is applied</li><li>• The unit is ready for operation</li></ul> 2. Start calibration by clicking [Start calibration]. |

# 13 Parameterizing the power section

Motor/brake startup with MOVIFIT® FC

11. Select the connected brake for brakemotors.

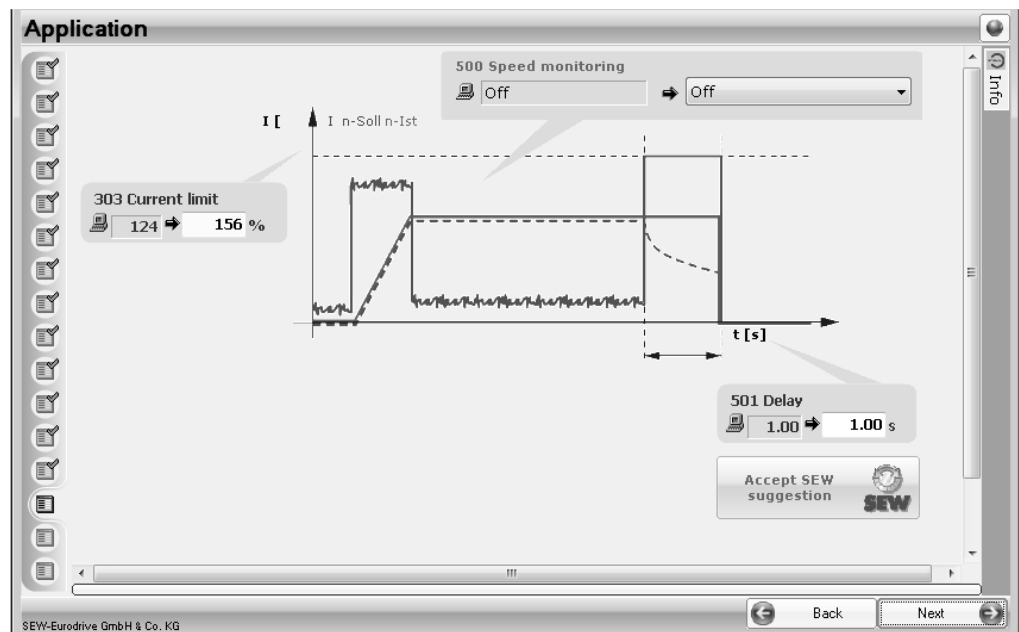


9007200047699339

| Setting                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard SEW brake control | <p>If the motor is equipped with the SEW-EURODRIVE brake for the MOVIFIT® drive, select the brake according to the name-plate data in "manual selection".</p> <p>The connected brake is directly supplied from the DC link and thus uses regenerative energy. The temperature of the brake is monitored.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative brake control  | <p>With this setting, the drive must be equipped with an internal or external braking resistor. The braking resistor dissipates the regenerative energy during deceleration.</p> <p>The alternative brake control is intended for the following cases:</p> <ul style="list-style-type: none"> <li>The motor is equipped with a brake different from the one intended for the MOVIFIT® drive.</li> <li>Several motors/brakes are operated with one MOVIFIT® unit in parallel.<sup>1)</sup></li> </ul> <p>If "via constant voltage" is selected, enter the brake supply voltage either as AC or DC voltage.</p> <p>If "via digital output" is selected, a brake rectifier is required that releases the brake when the digital output signal is set.</p> <p>If "no brake" is selected, the motor is not equipped with a brake.</p> |

1) In this case, you must have already selected the setting "identical" drives in the dialog "system configuration".

### 12. Select the application data.



18014399397866635

13

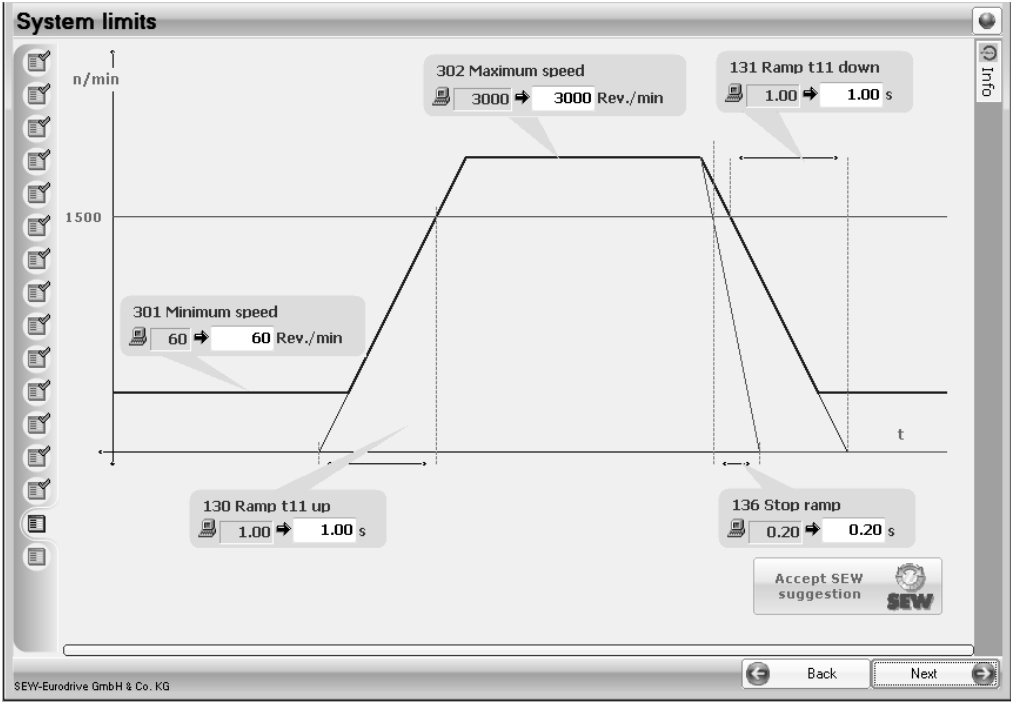
Parameterizing the power section

Motor/brake startup with MOVIFIT® FC

| Setting/button                 | Description                                                                                                                                                                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Speed monitoring <sup>1)</sup> | If the output current permanently reaches the set current limit with activated speed monitoring, an error is triggered after the set delay time.                                                                                                                       |
| Current limit                  | The current limit is based on a percentage basis of the nominal unit current. The output frequency is reduced to protect the motor from stalling when the current limit is reached.<br><br>To ensure stall protection, accept the default value for the current limit. |
| Black arrow                    | Click the black arrow to accept the suggested value.<br><br>For additional options, open the context menu of the edit box.                                                                                                                                             |
| Accept SEW suggestion          | Use this button to accept all suggested values at once.                                                                                                                                                                                                                |

1) In hoist mode, speed monitoring is activated as standard.

13. Select the system limits.



18014399412964363

| Setting/button                              | Description                                                                                                                                                                                                                                                                                                |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ramp times (ramp up, stop ramp, ramp down)  | The ramp times are always based on a change in the output speed of 1500 1/min.<br><br>The ramp times apply when a ramp time has not been specified via the process data and an enable/revoke enable occurs.<br><br>The stop ramp is active when a "Rapid stop" is requested or when specific errors occur. |
| Speed limits (minimum speed, maximum speed) | The minimum and maximum speed are set in the MOVIFIT® unit.                                                                                                                                                                                                                                                |

21361797/EN – 12/2015

| Setting/button             | Description                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------|
| Black arrow                | Click the black arrow to accept the suggested value.<br>For additional options, open the context menu of the edit box. |
| Accept SEW sug-<br>gestion | Use this button to accept all suggested values at once.                                                                |

14. Select the download options.



18014399415899787

| Button                                  | Description                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------|
| Back                                    | Use this button to go back to previous dialogs. The settings are not lost.       |
| Load into unit (PC -><br>target system) | Click this button to transfer all set parameters to the unit.                    |
| Finish                                  | Click this button to transfer all set parameters to the unit and finish startup. |

## 13.3 Parameter list for the MOVIFIT® SC power section

| 0.. Display values |            |               |                        |                                                                           |                   |
|--------------------|------------|---------------|------------------------|---------------------------------------------------------------------------|-------------------|
| 00. Process values |            |               |                        |                                                                           |                   |
| No.                | Index dec. | Subindex dec. | Name                   | Range/factory setting                                                     | MOVILINK® scaling |
| 000                | 10096      | 11            | Output current drive 1 | %                                                                         | 1 digit = 0.001%  |
| 001                | 10096      | 12            | Output current drive 2 | %                                                                         | 1 digit = 0.001%  |
| 002                | 10096      | 13            | Nominal line frequency | 0: 50 Hz<br>1: 60 Hz<br>2: <b>Not recognized</b>                          | –                 |
| 003                | 10096      | 14            | Mains phase sequence   | 0: <b>Not recognized</b><br>1: CW rotating field<br>2: CCW rotating field | –                 |

| 0.. Display values  |            |               |                        |                       |                          |
|---------------------|------------|---------------|------------------------|-----------------------|--------------------------|
| 01. Status displays |            |               |                        |                       |                          |
| No.                 | Index dec. | Subindex dec. | Name                   | Range/factory setting | MOVILINK® scaling        |
| 010                 | 8310       | 0             | Starter status         | Text                  | –                        |
| 011                 | 8310       | 0             | Operating state        | Text                  | –                        |
| 012                 | 8310       | 0             | Error status           | Text                  | –                        |
| 014                 | 8327       | 0             | Heat sink temperature  | °C                    | 1 digit = 1 °C           |
| 015                 | 10096      | 10            | DIP switch setting S10 | Bit field             | –                        |
| 016                 | 8328       | 0             | Operating hours        | h                     | 1 digit = 1 min = 1/60 h |
| 017                 | 8328       | 0             | Enable hours           | h                     | 1 digit = 1 min = 1/60 h |

| 0.. Display values                                       |            |               |                                |                               |                   |
|----------------------------------------------------------|------------|---------------|--------------------------------|-------------------------------|-------------------|
| 03. Digital inputs (only in "SBus slave" operating mode) |            |               |                                |                               |                   |
| No.                                                      | Index dec. | Subindex dec. | Name                           | Range/factory setting         | MOVILINK® scaling |
| 031                                                      | 8334 Bit 1 | 0             | Position digital input DI100   | Bit field                     | –                 |
|                                                          | 8335       | 0             | Digital input DI100 assignment | No function (factory setting) | –                 |
| 032                                                      | 8334 Bit 2 | 0             | Position digital input DI101   | Bit field                     | –                 |
|                                                          | 8336       | 0             | digital input DI101 assignment | No function (factory setting) | –                 |
| 033                                                      | 8334 Bit 3 | 0             | Position digital input DI102   | Bit field                     | –                 |
|                                                          | 8337       | 0             | digital input DI102 assignment | No function (factory setting) | –                 |
| 034                                                      | 8334 Bit 4 | 0             | Position digital input DI103   | Bit field                     | –                 |
|                                                          | 8338       | 0             | digital input DI103 assignment | No function (factory setting) | –                 |

| 0.. Display values  |            |               |                                |                                  |                   |
|---------------------|------------|---------------|--------------------------------|----------------------------------|-------------------|
| 05. Digital outputs |            |               |                                |                                  |                   |
| No.                 | Index dec. | Subindex dec. | Name                           | Range/factory setting            | MOVILINK® scaling |
| 050                 | 8349 Bit 0 | 0             | Position digital output DB00   | Bit field                        | –                 |
|                     | 8350       | 0             | digital output DB00 assignment | Brake released (factory setting) | –                 |
| 051                 | 8349 Bit 1 | 0             | Position digital output DB01   | Bit field                        | –                 |
|                     | 8351       | 0             | Digital output DB01 assignment | Brake released (factory setting) | –                 |

| 0.. Display values |            |               |                        |                         |                   |
|--------------------|------------|---------------|------------------------|-------------------------|-------------------|
| 07. Unit data      |            |               |                        |                         |                   |
| No.                | Index dec. | Subindex dec. | Name                   | Range/factory setting   | MOVILINK® scaling |
| 070                | 8301       | 0             | Device type            | Text                    | –                 |
|                    | –          | –             | Unit series            | Text                    | –                 |
| 071                | 8361       | 0             | Nominal output current | A                       | 1 digit = 0.001 A |
| 076                | 8300       | 0             | Basic unit firmware    | Part number and version | –                 |
|                    | 8314–8317  | 0             | Signature              | Text                    | –                 |



| 0.. Display values                                                              |            |               |                           |                                      |                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                   |
| Fault t-0: Background information for faults that occurred in the past when t-0 |            |               |                           |                                      |                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling |
| 080                                                                             | 8366       | 0             | Error code                | Error code                           | –                 |
|                                                                                 | 9304       | 0             | Fault subcode             | –                                    | –                 |
|                                                                                 | 8883       | 0             | Internal error            | –                                    | –                 |
|                                                                                 | 8371       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                 |
|                                                                                 | 8381       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                 |
|                                                                                 | 8391       | 0             | Inverter status           | Text                                 | –                 |
|                                                                                 | 8396       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C    |

| 0.. Display values  |            |               |                    |                       |                   |
|---------------------|------------|---------------|--------------------|-----------------------|-------------------|
| 09. Bus diagnostics |            |               |                    |                       |                   |
| No.                 | Index dec. | Subindex dec. | Name <sup>1)</sup> | Range/factory setting | MOVILINK® scaling |
| 094                 | 8455       | 0             | PO1 setpoint       | hex                   | –                 |
| 095                 | 8456       | 0             | PO2 setpoint       | hex                   | –                 |
| 096                 | 8457       | 0             | PO3 setpoint       | hex                   | –                 |
| 097                 | 8458       | 0             | PI1 actual value   | hex                   | –                 |
| 098                 | 8459       | 0             | PI2 actual value   | hex                   | –                 |
| 099                 | 8460       | 0             | PI3 actual value   | hex                   | –                 |

1) PI = process input data word, PO = process output data word

| 1.. Setpoints/ramp generators |            |               |                           |                       |                   |
|-------------------------------|------------|---------------|---------------------------|-----------------------|-------------------|
| 13. Soft startup time 1       |            |               |                           |                       |                   |
| No.                           | Index dec. | Subindex dec. | Name                      | Range/factory setting | MOVILINK® scaling |
| 130 <sup>1)</sup>             | 10096      | 1             | Soft startup time drive 1 | 0 – 0.2 – 1 s         | 1 digit = 0.001 s |
| 131 <sup>1)</sup>             | 10096      | 2             | Soft startup time drive 2 | 0 – 0.2 – 1 s         | 1 digit = 0.001 s |

1) The default value is dependent on the DIP switch setting.

| 1.. Setpoints/ramp generators       |            |               |                |                       |                   |
|-------------------------------------|------------|---------------|----------------|-----------------------|-------------------|
| 14. Change in direction of rotation |            |               |                |                       |                   |
| No.                                 | Index dec. | Subindex dec. | Name           | Range/factory setting | MOVILINK® scaling |
| 140                                 | 10096      | 20            | Reversing time | 0.05 – 0.2 – 10 s     | 1 digit = 0.001 s |

| 2.. Power supply  |            |               |                                    |                                                                                                                                             |                   |
|-------------------|------------|---------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| No.               | Index dec. | Subindex dec. | Name                               | Range/factory setting                                                                                                                       | MOVILINK® scaling |
| 200 <sup>1)</sup> | 10096      | 19            | Nominal line voltage               | 0: 400 V<br>1: 500 V                                                                                                                        | –                 |
| 201               | 8927       | 0             | Monitoring of mains phase sequence | 06 = Off: Deactivation of mains phase sequence monitoring possible<br>18 = On: Deactivation of mains phase sequence monitoring not possible | –                 |

1) The default value is dependent on the DIP switch setting.

| 3.. Motor parameters |            |               |                            |                       |                   |
|----------------------|------------|---------------|----------------------------|-----------------------|-------------------|
| 30. Limits drive 1   |            |               |                            |                       |                   |
| No.                  | Index dec. | Subindex dec. | Name                       | Range/factory setting | MOVILINK® scaling |
| 300                  | 10096      | 6             | Switch-off current drive 1 | 1 – 150%              | 1 digit = 1%      |
| 301                  | 10096      | 8             | Deceleration time drive 1  | 0 – 2 – 10 s          | 1 digit = 0.001 s |

| 3.. Motor parameters |            |               |                            |                       |                   |
|----------------------|------------|---------------|----------------------------|-----------------------|-------------------|
| 31. Limits drive 2   |            |               |                            |                       |                   |
| No.                  | Index dec. | Subindex dec. | Name                       | Range/factory setting | MOVILINK® scaling |
| 310                  | 10096      | 7             | Switch-off current drive 2 | 1 – 150%              | 1 digit = 1%      |
| 311                  | 10096      | 9             | Deceleration time drive 2  | 0 – 2 – 10 s          | 1 digit = 0.001 s |

| 3.. Motor parameters |            |               |                          |                       |                   |
|----------------------|------------|---------------|--------------------------|-----------------------|-------------------|
| 34. Motor protection |            |               |                          |                       |                   |
| No.                  | Index dec. | Subindex dec. | Name                     | Range/factory setting | MOVILINK® scaling |
| 340                  | 8533       | 0             | Motor protection drive 1 | 0: Off<br>1: On       | –                 |
| 341                  | 9114       | 0             | Rated current drive 1    | 0.1 – 10 A            | 1 digit = 0.001 A |
| 342                  | 8535       | 0             | Motor protection drive 2 | 0: Off<br>1: On       | –                 |
| 343                  | 9115       | 0             | Rated current drive 2    | 0.1 – 10 A            | 1 digit = 0.001 A |

| 6.. Terminal assignment                                  |            |               |                     |                                                                    |                   |
|----------------------------------------------------------|------------|---------------|---------------------|--------------------------------------------------------------------|-------------------|
| 60. Digital inputs (only in "SBus slave" operating mode) |            |               |                     |                                                                    |                   |
| No.                                                      | Index dec. | Subindex dec. | Name                | Range/factory setting                                              | MOVILINK® scaling |
| 600                                                      | 8335       | 0             | digital input DI100 | 0: No function<br>11: External fault (0 active)<br>12: Error reset | –                 |
| 601                                                      | 8336       | 0             | digital input DI101 |                                                                    |                   |
| 602                                                      | 8337       | 0             | digital input DI102 |                                                                    |                   |
| 603                                                      | 8338       | 0             | digital input DI103 |                                                                    |                   |

| 6.. Terminal assignment |            |               |                     |                                                                                                                                                                  |                   |
|-------------------------|------------|---------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 62. Digital outputs     |            |               |                     |                                                                                                                                                                  |                   |
| No.                     | Index dec. | Subindex dec. | Name                | Range/factory setting                                                                                                                                            | MOVILINK® scaling |
| 620                     | 8350       | 0             | digital output DB00 | 0: No function<br>1: Fault drive 1<br>2: Fault drive 2<br>3: Ready for operation<br>4: Drive 1 ON<br>5: Drive 2 ON<br>6: Brake 1 released<br>7: Brake 2 released | –                 |
| 621                     | 8351       | 0             | digital output DB01 | 0: No function<br>1: Fault drive 1<br>2: Fault drive 2<br>3: Ready for operation<br>4: Drive 1 ON<br>5: Drive 2 ON<br>6: Brake 1 released<br>7: Brake 2 released | –                 |

| 7.. Control functions |            |               |                |                                                      |                   |
|-----------------------|------------|---------------|----------------|------------------------------------------------------|-------------------|
| 70. Operating modes   |            |               |                |                                                      |                   |
| No.                   | Index dec. | Subindex dec. | Name           | Range/factory setting                                | MOVILINK® scaling |
| 700 <sup>1)</sup>     | 10096      | 3             | Operating mode | 0: Single-motor operation<br>1: Dual-motor operation | –                 |

1) The default value is dependent on the DIP switch setting.

| 7.. Control functions |            |               |                                |                       |                   |
|-----------------------|------------|---------------|--------------------------------|-----------------------|-------------------|
| 73. Brake function    |            |               |                                |                       |                   |
| No.                   | Index dec. | Subindex dec. | Name                           | Range/factory setting | MOVILINK® scaling |
| 731                   | 10096      | 4             | Brake application time drive 1 | 0 – 10 s              | 1 digit = 0.001 s |
| 734                   | 10096      | 5             | Brake application time drive 2 | 0 – 10 s              | 1 digit = 0.001 s |
| 736 <sup>1)</sup>     | 9400       | 0             | Rated brake voltage drive 1    | 2: 400 V<br>3: 500 V  | –                 |

| 7.. Control functions |            |               |                                               |                       |                   |
|-----------------------|------------|---------------|-----------------------------------------------|-----------------------|-------------------|
| 73. Brake function    |            |               |                                               |                       |                   |
| No.                   | Index dec. | Subindex dec. | Name                                          | Range/factory setting | MOVILINK® scaling |
| 737 <sup>1)</sup>     | 9401       | 0             | Rated brake voltage drive 2                   | 2: 400 V<br>3: 500 V  | –                 |
| 738                   | 8893       | 0             | Activate "Brake release without drive enable" | 0: Off<br>1: On       | –                 |

1) The default value is dependent on the DIP switch setting.

| 8.. Unit functions |            |               |                 |                                           |                   |
|--------------------|------------|---------------|-----------------|-------------------------------------------|-------------------|
| 80. Setup          |            |               |                 |                                           |                   |
| No.                | Index dec. | Subindex dec. | Name            | Range/factory setting                     | MOVILINK® scaling |
| 802                | 8594       | 0             | Factory setting | 0: No<br>1: Standard<br>2: Delivery state | –                 |
| 803                | 8595       | 0             | Parameter lock  | 0: Off<br>1: On                           | –                 |

| 8.. Unit functions       |            |               |                                 |                             |                   |
|--------------------------|------------|---------------|---------------------------------|-----------------------------|-------------------|
| 81. Serial communication |            |               |                                 |                             |                   |
| No.                      | Index dec. | Subindex dec. | Name                            | Range/factory setting       | MOVILINK® scaling |
| 813                      | 8600       | 0             | SBus address (display values)   | Master: 1<br>Slave: 16 – 31 | –                 |
| 816                      | 8603       | 0             | SBus baud rate (display values) | 2: 500 kBd                  | –                 |

| 8.. Unit functions  |            |               |                            |                                                                        |                   |
|---------------------|------------|---------------|----------------------------|------------------------------------------------------------------------|-------------------|
| 83. Fault responses |            |               |                            |                                                                        |                   |
| No.                 | Index dec. | Subindex dec. | Name                       | Range/factory setting                                                  | MOVILINK® scaling |
| 830                 | 8609       | 0             | External fault response    | 0: No response<br>2: Immediate stop/fault<br>5: Immediate stop/warning | –                 |
| 835                 | 8616       | 0             | TF signal response         | 0: No response<br>2: Immediate stop/fault                              | –                 |
| 836                 | 8615       | 0             | Response to SBus timeout   | 2: Immediate stop/fault<br>5: Immediate stop/Warning                   | –                 |
| 839                 | 10454      | 1             | Fault response output open | 0: No response<br>2: Immediate stop/fault                              | –                 |

| 8.. Unit functions |            |               |              |                       |                   |
|--------------------|------------|---------------|--------------|-----------------------|-------------------|
| 84. Reset behavior |            |               |              |                       |                   |
| No.                | Index dec. | Subindex dec. | Name         | Range/factory setting | MOVILINK® scaling |
| 840                | 8617       | 0             | Manual reset | 0: No<br>1: Yes       | –                 |

| 8.. Unit functions                           |            |               |                              |                       |                   |
|----------------------------------------------|------------|---------------|------------------------------|-----------------------|-------------------|
| 87. Process data assignment (display values) |            |               |                              |                       |                   |
| No.                                          | Index dec. | Subindex dec. | Name <sup>1)</sup>           | Range/factory setting | MOVILINK® scaling |
| 870                                          | 8304       | 0             | Setpoint description PO1     | Control word SC       | –                 |
| 871                                          | 8305       | 0             | Setpoint description PO2     | No function           | –                 |
| 872                                          | 8306       | 0             | Setpoint description PO3     | No function           | –                 |
| 873                                          | 8307       | 0             | Actual value description PI1 | Status word SC        | –                 |
| 874                                          | 8308       | 0             | Actual value description PI2 | Status word SC        | –                 |
| 875                                          | 8309       | 0             | Actual value description PI3 | Output current SC     | –                 |

1) PI = process input data word, PO = process output data word

### 13.4 Parameter description for MOVIFIT® SC

#### 13.4.1 0.. Display values

##### Parameter 000/001 – Output current drive 1/2

Apparent current of drive 1/2 in range 0 – 200% of the nominal unit current.

##### Parameter 002 – Nominal line frequency

Display of the automatically determined line frequency.

##### Parameter 003 – Mains phase sequence



#### ▲ WARNING

Unexpected plant behavior due to incorrect connection. Incorrect connection will cause incorrect motor rotation and/or uncontrolled motor startup.

Fatal or severe injuries and damage to property.

- Check the wiring according to the operating instructions prior to starting the motor.

Display of the automatically determined connection sequence of the supply system input phases.

A distinction is made between a clockwise rotating field and counterclockwise rotating field.

In dual-motor operation, mains phases L1, L2, and L3 must be connected as a clockwise rotating field at the terminals in the unit. If you do not follow this sequence, the unit generates the error message "Startup, no. 9, internal error 3" when the power is connected. In this case, the power section will not be enabled.

Monitoring can only be deactivated via Parameter *P201* in combination with bit 10 in the control word.

##### Parameter 010 – Starter status

The output stage can have the following states:

- Disabled
- Enabled

##### Parameter 011 – Operating state

The following operating states are possible:

- 24 V operation
- No enable
- Enable
- Factory setting
- Fault

**Parameter 012 – Fault status**

Fault status in text form.

**Parameter 014 – Heat sink temperature**

Heat sink temperature of the unit.

**Parameter 015 – DIP switch setting S10**

Display of DIP switch setting S10.

| DIP switch | Bit in index<br>10087.135 | Functionality             |                                                      |
|------------|---------------------------|---------------------------|------------------------------------------------------|
| S10/1      | Bit 2                     | Startup mode              | 0: Easy mode<br>1: Expert mode                       |
| S10/2      | Bit 3                     | Operating mode            | 0: Single-motor operation<br>1: Dual-motor operation |
| S10/3      | Bit 4                     | Nominal line voltage      | 0: 400 V (380/400/415 V)<br>1: 500 V (460/480/500 V) |
| S10/4      | Bit 5                     | Rated brake voltage Bit 0 | Bit 0 = 0 and Bit 1 = 0: 400 V                       |
| S10/5      | Bit 6                     | Rated brake voltage Bit 1 | Bit 0 = 1 and Bit 1 = 1: 500 V                       |
| S10/6      | Bit 7                     | Soft start                | 0: Enabled<br>1: Disabled                            |

**Parameter 016 – Power-applied hours**

The total of hours in which the unit was connected to the external DC 24 V supply.

**Parameter 017 – Enable hours**

The total of hours in which the output stage of the unit was enabled.

**Parameter 031 to 034 – Setting/assignment of digital input DI100 to DI103**

Display of the status of digital input DI100 to DI103 (only in "SBus slave" operating mode).

**Parameter 050/051 – Setting/assignment of digital output DB00/DB01**

Display of the status of digital output DB00/DB01.

**Parameter 070 – Unit type**

Display of the unit type and the unit series.

**Parameter 071 – Nominal output current**

Nominal unit current in A.

### Parameter 076 – Basic unit firmware

Part number, version and signature of the basic unit firmware.

### Parameter 080 – Fault t-0

The unit saves the diagnostic data when a fault occurs. Most recent fault from the fault memory.

### Parameter 094 to 096 – PO1 to PO3 setpoint

Process output data word 1 to 3.

### Parameter 097 to 099 – PI1 bis PI3 actual value

Process input data word 1 to 3.

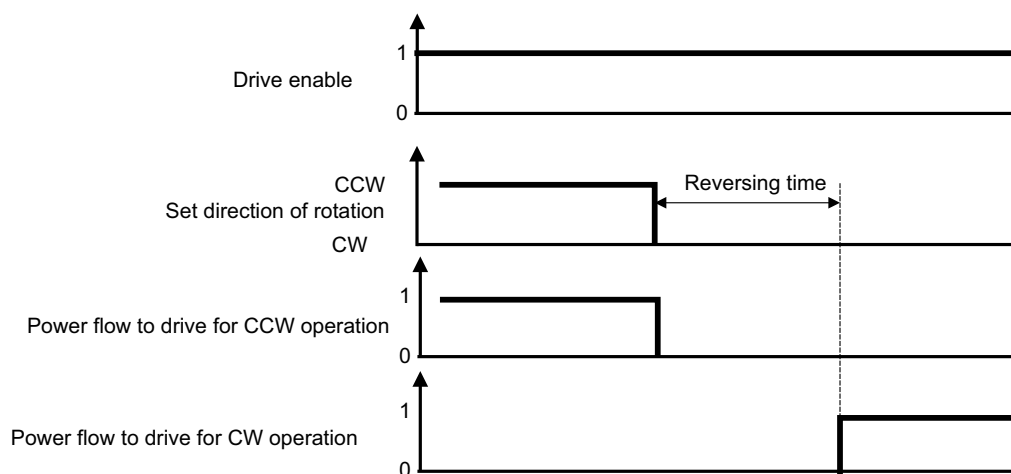
## 13.4.2 1.. Setpoint/ramp generators

### Parameter 130/131 – Soft startup time drive 1/2

Soft startup time to limit the starting current for drive 1/2. A phase angle takes place after enable in the time period defined in this parameter.

### Parameter 140 – Reversing time

The time for which the power of drive 1 is switched off in single-motor operation during a change in the direction of rotation before power is supplied again for the new direction of rotation.



9007200047659403

### 13.4.3 2.. Power supply

#### Parameter 200 – Nominal line voltage

Adapts the unit to the nominal input voltage of the supplying system.

Choose the setting 400 V when the supply system supplies the voltage 3 x AC 380 V, 3 x AC 400 V or 3 x AC 415 V.

Choose the setting 480 V when the supply system supplies the voltage 3 x AC 460 V, 3 x AC 500 V or 3 x AC 500 V.

#### Parameter 201 – Monitoring of mains phase sequence

If this parameter is set to "Off", you can deactivate mains phase sequence monitoring for dual-motor operation by setting the bit 10 in process output data word PO1.

Deactivation for dual-motor operation must occur before the mains voltage supply is switched on with a counterclockwise rotating field.

### 13.4.4 3.. Motor parameters

#### Parameter 300/310 – Interrupting current drive 1/2

Switch-off limit for drive 1/2.

#### Parameter 301/311 – Deceleration time drive 1/2

Specifies how long the interrupting current for drive 1/2 can be exceeded without the unit switching off with the error message "Motor overtemperature".

#### Parameter 340/342 – Motor protection drive 1/2

Activates or deactivates the thermal protection model for drive 1/2.

When this function is activated, the MOVIFIT® unit takes over the thermal protection of the drive 1/2 by electronic means. Motor utilization is determined using the inverter output current, the time and the nominal current of drive 1/2 set in parameter *P341/P343*.

#### Parameter 341/343 – Nominal current drive 1/2

Nominal current of the connected drive necessary for calculating the thermal protection model for the drive 1/2.

You find the nominal current on the nameplate of the motor.

### 13.4.5 6.. Terminal assignment

#### Parameter 600 to 603 – Digital inputs DI100 to DI103 (only in "SBus slave" unit design)

| Setting            | "0" signal                         | "1" signal                         |
|--------------------|------------------------------------|------------------------------------|
| 0: No function     | –                                  | –                                  |
| 11: External fault | External fault                     | –                                  |
| 12: Error reset    | Reset on positive edge from 0 to 1 | Reset on positive edge from 0 to 1 |

#### Parameter 620/621 – Digital outputs DB00/DB01



#### ▲ WARNING

Unexpected plant behavior if the digital outputs DB00 or DB01 are used for controlling the brake and parameters are incorrectly set.

Fatal or severe injuries and damage to property.

- If the DB00 and DB01 digital outputs are used for controlling the brake, set parameter *P620/621* to "brake released" and make sure that the parameter setting will not be changed again.
- Before you use digital outputs to control the brake, check the parameter settings.

| Setting                | "0" signal            | "1" signal             |
|------------------------|-----------------------|------------------------|
| 0: No function         | –                     | –                      |
| 1: Fault drive 1       | No malfunction        | Fault drive 1          |
| 2: Fault drive 2       | No malfunction        | Fault drive 2          |
| 3: Ready for operation | Not ready             | Ready for operation    |
| 4: Drive 1 ON          | Drive 1 not enabled   | Drive 1 enabled        |
| 5: Drive 2 ON          | Drive 2 not enabled   | Drive 2 enabled        |
| 6: Brake 1 released    | Brake drive 1 applied | Brake drive 1 released |
| 7: Brake 2 released    | Brake drive 2 applied | Brake drive 2 released |



## 13.4.6 7.. Control functions

## Parameter 700 – Operating mode

**▲ WARNING**

Unexpected plant behavior due to incorrect connection. Incorrect connection will cause incorrect motor rotation and/or uncontrolled motor startup.

Fatal or severe injuries and damage to property.

- Check the wiring according to the operating instructions prior to starting the motor.

The unit offers you the option of controlling up to 2 drives separately. If drives are used with a brake control via 2 coils from SEW-EURODRIVE, the brakes are also controlled separately via the MOVIFIT® unit.

**Single-motor operation****▲ WARNING**

Unexpected plant behavior due to incorrect connection. Do not connect the X9 and X91 terminals or the X9 plug connector in single-motor operation.

Fatal or severe injuries and damage to property.

- Use only the X8 and X81 terminals or the X8 plug connector in single-motor operation.

In the single-motor operation mode, the motor connected at terminal X8 can be run "clockwise" and "counterclockwise".

If a brakemotor with brake control via 2 coils from SEW-EURODRIVE is used, the brake must be connected to X8.

If the current measured at the output for drive 2 in single-motor operation mode exceeds a value of 10% of the nominal motor current  $I_N$ , the unit switches off and locks.

**Dual-motor operation**

In the dual-motor operation mode, drive 1 connected at X8 and drive 2 connected at X9 can be run independently of one another in one direction of rotation.

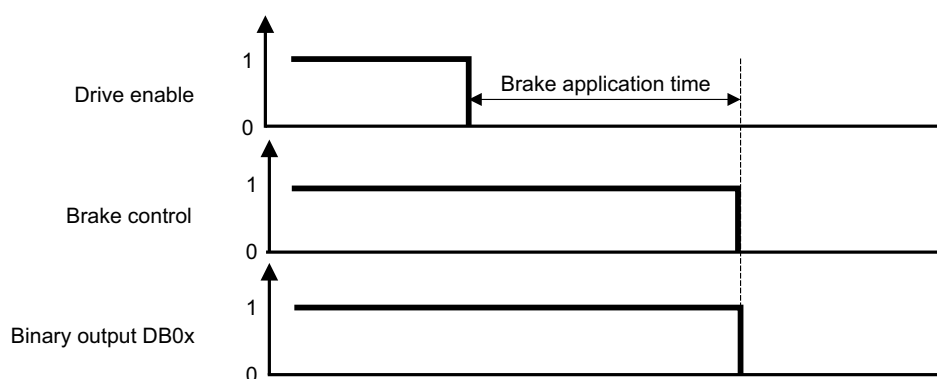
If brakemotors with brake control via 2 coils from SEW-EURODRIVE are used, the brakes must be connected as follows:

- Brake of drive 1 at X8
- Brake of drive 2 at X9

**Parameter 731/734 – Brake application time drive 1/2**

Delay between the time when the drive enable is revoked for drive 1/2 and when the brake is applied. This delay affects the following components:

- The brake with brake control via 2 coils from SEW-EURODRIVE connected to X8/X9.
- The digital output with the functionality "brake 1/2 released".



9007200047661067

#### Parameter 736/737 – Rated brake voltage drive 1/2

If a brake with brake control via 2 coils from SEW-EURODRIVE is connected to X8/X9, this parameter is used to adapt the unit to the nominal voltage of the brake used at the drive 1/2.

When ordering the motor and the brake, make sure that the rated brake voltage and the nominal line voltage match.

#### Parameter 738 – Activate brake release without drive enable

If this parameter is set to "On" you can release the brake without drive enable. To do so, set the respective bits in process output data word PO1. In dual-motor operation, the brake of drive 1 and the brake of drive 2 can be released independently of each other.

The brake is always applied when the unit is not ready for operation.

### 13.4.7 8.. Unit functions

#### Parameter 802 – Factory setting

If this parameter is set to "delivery state" all parameters, that have a factory setting value and cannot be set via DIP switch S10, are reset to the factory setting value.

The following parameters that can be set in Easy mode using DIP switch S10, the DIP switch setting is activated when the factory setting "delivery state" is selected.

- Parameter 200 – *Nominal line voltage*
- Parameter 700 – *Starter operating mode*
- Parameter 736 – *Rated brake voltage drive 1*
- Parameter 737 – *Rated brake voltage drive 2*

#### Parameter 803 – Parameter lock

If this parameter is set to "On" you cannot change any parameters. An exception is the parameter "Parameter lock".

This setting makes sense once you have finished starting up the unit and optimizing the parameters. Changing parameters is only possible again when you set this parameter to "Off".

#### Parameter 813 – SBus address

SBus unit address of the starter power section.

#### Parameter 816 – SBus baud rate

Baud rate of the bus communication to the starter power section.

#### Parameter 830 – Response to external fault

Programs the fault response that is triggered by an input terminal programmed to "11: External fault" (only in "SBus slave" operating mode).

#### Parameter 835 – Response to TF message

If a temperature sensor is installed in the motor winding, this parameter programs the fault response triggered during temperature monitoring.

#### Parameter 836 – Response to SBus timeout

Programs the fault response that is triggered by SBus timeout monitoring.

**Parameter 839 – Response to open output**

If the motor starter recognizes the fault "Open output", this parameter programs the fault response.

**Parameter 840 – Manual reset**

If a fault is present at the power section, you can acknowledge the fault by setting this parameter to "Yes". Once the fault has been reset, the parameter is set automatically to "No" again. If the power section does not indicate a fault, setting the parameter to "Yes" has no effect.

**Parameter 870 to 872 – Setpoint description PO1 to PO3**

Assignment of the process output data words PO1 to PO3.

**Parameter 873 to 875 – Actual value description PI1 bis PI3**

Assignment of the process input data words PI1 to PI3.

### 13.5 Parameter list for the MOVIFIT® FC power section

| 0.. Display values |            |               |                         |                       |                                   |
|--------------------|------------|---------------|-------------------------|-----------------------|-----------------------------------|
| 00. Process values |            |               |                         |                       |                                   |
| No.                | Index dec. | Subindex dec. | Name                    | Range/factory setting | MOVILINK® scaling                 |
| 000                | 8318       | 0             | Speed (signed)          | min <sup>-1</sup>     | 1 digit = 0.001 min <sup>-1</sup> |
| 002                | 8319       | 0             | Frequency (signed)      | Hz                    | 1 digit = 0.001 Hz                |
| 004                | 8321       | 0             | Output current          | %I <sub>N</sub>       | 1 digit = 0.001 %I <sub>N</sub>   |
| 005                | 8322       | 0             | Active current (signed) | %I <sub>N</sub>       | 1 digit = 0.001 %I <sub>N</sub>   |
| 006                | 8323       | 0             | Motor utilization 1     | %                     | 1 digit = 0.001 %                 |
| 007                | 8342       | 0             | Motor utilization 2     | %                     | 1 digit = 0.001 %                 |
| 008                | 8325       | 0             | DC link voltage         | V                     | 1 digit = 0.001 V                 |
| 009                | 8326       | 0             | Output current          | A                     | 1 digit = 0.001 A                 |

| 0.. Display values  |            |               |                        |                       |                          |
|---------------------|------------|---------------|------------------------|-----------------------|--------------------------|
| 01. Status displays |            |               |                        |                       |                          |
| No.                 | Index dec. | Subindex dec. | Name                   | Range/factory setting | MOVILINK® scaling        |
| 010                 | 8310       | 0             | Inverter status        | Text                  | –                        |
| 011                 | 8310       | 0             | Operating state        | Text                  | –                        |
| 012                 | 8310       | 0             | Error status           | Text                  | –                        |
| 013                 | 8310 Bit 4 | –             | Current parameter set  | Parameter set 1 or 2  | –                        |
| 014                 | 8327       | 0             | Heat sink temperature  | °C                    | 1 digit = 1 °C           |
| 015                 | 10087      | 135           | DIP switch setting S10 | Bit field             | –                        |
| 016                 | 8328       | 0             | Operating hours        | h                     | 1 digit = 1 min = 1/60 h |
| 017                 | 8329       | 0             | Enable hours           | h                     | 1 digit = 1 min = 1/60 h |

| 0.. Display values                                       |            |               |                                |                               |                   |
|----------------------------------------------------------|------------|---------------|--------------------------------|-------------------------------|-------------------|
| 03. Digital inputs (only in "SBus slave" operating mode) |            |               |                                |                               |                   |
| No.                                                      | Index dec. | Subindex dec. | Name                           | Range/factory setting         | MOVILINK® scaling |
| 031                                                      | 8334 Bit 1 | 0             | Position digital input DI100   | Bit field                     | –                 |
|                                                          | 8335       | 0             | digital input DI100 assignment | No function (factory setting) | –                 |
| 032                                                      | 8334 Bit 2 | 0             | Position digital input DI101   | Bit field                     | –                 |
|                                                          | 8336       | 0             | digital input DI101 assignment | No function (factory setting) | –                 |
| 033                                                      | 8334 Bit 3 | 0             | Position digital input DI102   | Bit field                     | –                 |
|                                                          | 8337       | 0             | digital input DI102 assignment | No function (factory setting) | –                 |
| 034                                                      | 8334 Bit 4 | 0             | Position digital input DI103   | Bit field                     | –                 |
|                                                          | 8338       | 0             | digital input DI103 assignment | No function (factory setting) | –                 |

| 0.. Display values  |            |               |                                |                                  |                   |
|---------------------|------------|---------------|--------------------------------|----------------------------------|-------------------|
| 05. Digital outputs |            |               |                                |                                  |                   |
| No.                 | Index dec. | Subindex dec. | Name                           | Range/factory setting            | MOVILINK® scaling |
| 050                 | 8349 Bit 0 | 0             | Position digital output DB00   | Bit field                        | –                 |
|                     | 8350       | 0             | digital output DB00 assignment | Brake released (factory setting) | –                 |

| 0.. Display values |            |               |                        |                         |                   |
|--------------------|------------|---------------|------------------------|-------------------------|-------------------|
| 07. Unit data      |            |               |                        |                         |                   |
| No.                | Index dec. | Subindex dec. | Name                   | Range/factory setting   | MOVILINK® scaling |
| 070                | 8301       | 0             | Device type            | Text                    | –                 |
|                    | –          | –             | Unit series            | Text                    | –                 |
| 071                | 8361       | 0             | Nominal output current | A                       | 1 digit = 0.001 A |
| 076                | 8300       | 0             | Basic unit firmware    | Part number and version | –                 |
|                    | 8314–8317  | 0             | Signature              | Text                    | –                 |

| 0.. Display values |            |               |                                    |                                                                                               |                   |
|--------------------|------------|---------------|------------------------------------|-----------------------------------------------------------------------------------------------|-------------------|
| 07. Unit data      |            |               |                                    |                                                                                               |                   |
| No.                | Index dec. | Subindex dec. | Name                               | Range/factory setting                                                                         | MOVILINK® scaling |
| 700                | 8574       | 0             | Operating mode 1                   | 0: VFC                                                                                        | –                 |
| 701                | 8575       | 0             | Operating mode 2                   | 2: VFC & hoist<br>3: VFC & DC braking<br>21: V/f characteristic curve<br>22: V/f & DC braking |                   |
| 013                | 8310 Bit 4 | –             | Current parameter set              | Parameter set 1 or 2                                                                          |                   |
| –                  | 10000      | 0             | Current motor data parameter set 1 | Name                                                                                          |                   |
| –                  | 8652       | 0             |                                    | Nominal voltage                                                                               | –                 |
| –                  | 8640       | 0             |                                    | Nominal frequency                                                                             | –                 |
| –                  | 8642       | 0             |                                    | Nominal speed                                                                                 | –                 |
| –                  | 10016      | 0             |                                    | Nominal power                                                                                 | –                 |
| –                  | 10076      | 13            |                                    | Brake type                                                                                    | –                 |
| –                  | 10019      | 0             | Current motor data parameter set 2 | Name                                                                                          | –                 |
| –                  | 8653       | 0             |                                    | Nominal voltage                                                                               | –                 |
| –                  | 8641       | 0             |                                    | Nominal frequency                                                                             | –                 |
| –                  | 8643       | 0             |                                    | Nominal speed                                                                                 | –                 |
| –                  | 10017      | 0             |                                    | Nominal power                                                                                 | –                 |
| –                  | 10076      | 113           |                                    | Brake type                                                                                    | –                 |

| 0.. Display values                                                              |            |               |                           |                                      |                                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-----------------------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                                   |
| Fault t-0: Background information for faults that occurred in the past when t-0 |            |               |                           |                                      |                                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling                 |
| 080                                                                             | 8366       | 0             | Error code                | Error code                           | –                                 |
|                                                                                 | 9304       | 0             | Fault subcode             | –                                    | –                                 |
|                                                                                 | 8883       | 0             | Internal error            | –                                    | –                                 |
|                                                                                 | 8371       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                                 |
|                                                                                 | 8381       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                                 |
|                                                                                 | 8391       | 0             | Inverter status           | Text                                 | –                                 |
|                                                                                 | 8396       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C                    |
|                                                                                 | 8401       | 0             | Speed                     | min <sup>-1</sup>                    | 1 digit = 0.001 min <sup>-1</sup> |
|                                                                                 | 8406       | 0             | Output current            | % I <sub>N</sub>                     | 1 digit = 0.001%I <sub>N</sub>    |
|                                                                                 | 8411       | 0             | Active current            | % I <sub>N</sub>                     | 1 digit = 0.001%I <sub>N</sub>    |
|                                                                                 | 8416       | 0             | Unit utilization          | % I <sub>N</sub>                     | 1 digit = 0.001%I <sub>N</sub>    |
|                                                                                 | 8421       | 0             | DC link voltage           | V                                    | 1 digit = 0.001 V                 |
|                                                                                 | 8426       | 0             | Operating hours           | h                                    | 1 digit = 1 min = 1/60 h          |
|                                                                                 | 8431       | 0             | Enable hours              | h                                    | 1 digit = 1 min = 1/60 h          |

| 0.. Display values                                                              |            |               |                           |                                      |                                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-----------------------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                                   |
| Fault t-1: Background information for faults that occurred in the past when t-1 |            |               |                           |                                      |                                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling                 |
| 081                                                                             | 8367       | 0             | Error code                | Error code                           | –                                 |
|                                                                                 | 9305       | 0             | Fault subcode             | –                                    | –                                 |
|                                                                                 | 8884       | 0             | Internal error            | –                                    | –                                 |
|                                                                                 | 8372       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                                 |
|                                                                                 | 8382       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                                 |
|                                                                                 | 8392       | 0             | Inverter status           | Text                                 | –                                 |
|                                                                                 | 8397       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C                    |
|                                                                                 | 8402       | 0             | Speed                     | min <sup>-1</sup>                    | 1 digit = 0.001 min <sup>-1</sup> |
|                                                                                 | 8407       | 0             | Output current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8412       | 0             | Active current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8417       | 0             | Unit utilization          | %                                    | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8422       | 0             | DC link voltage           | V                                    | 1 digit = 0.001 V                 |
|                                                                                 | 8427       | 0             | Operating hours           | h                                    | 1 digit = 1 min = 1/60 h          |
|                                                                                 | 8432       | 0             | Enable hours              | h                                    | 1 digit = 1 min = 1/60 h          |

| 0.. Display values                                                              |            |               |                           |                                      |                                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-----------------------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                                   |
| Fault t-2: Background information for faults that occurred in the past when t-2 |            |               |                           |                                      |                                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling                 |
| 082                                                                             | 8368       | 0             | Error code                | Error code                           | –                                 |
|                                                                                 | 9306       | 0             | Fault subcode             | –                                    | –                                 |
|                                                                                 | 8885       | 0             | Internal error            | –                                    | –                                 |
|                                                                                 | 8373       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                                 |
|                                                                                 | 8383       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                                 |
|                                                                                 | 8393       | 0             | Inverter status           | Text                                 | –                                 |
|                                                                                 | 8398       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C                    |
|                                                                                 | 8403       | 0             | Speed                     | min <sup>-1</sup>                    | 1 digit = 0.001 min <sup>-1</sup> |
|                                                                                 | 8408       | 0             | Output current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8413       | 0             | Active current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8418       | 0             | Unit utilization          | %                                    | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8423       | 0             | DC link voltage           | V                                    | 1 digit = 0.001 V                 |
|                                                                                 | 8428       | 0             | Operating hours           | h                                    | 1 digit = 1 min = 1/60 h          |
|                                                                                 | 8433       | 0             | Enable hours              | h                                    | 1 digit = 1 min = 1/60 h          |

| 0.. Display values                                                              |            |               |                           |                                      |                                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-----------------------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                                   |
| Fault t-3: Background information for faults that occurred in the past when t-3 |            |               |                           |                                      |                                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling                 |
| 083                                                                             | 8369       | 0             | Error code                | Error code                           | –                                 |
|                                                                                 | 9307       | 0             | Fault subcode             | –                                    | –                                 |
|                                                                                 | 8886       | 0             | Internal error            | –                                    | –                                 |
|                                                                                 | 8374       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                                 |
|                                                                                 | 8384       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                                 |
|                                                                                 | 8394       | 0             | Inverter status           | Text                                 | –                                 |
|                                                                                 | 8399       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C                    |
|                                                                                 | 8404       | 0             | Speed                     | min <sup>-1</sup>                    | 1 digit = 0.001 min <sup>-1</sup> |
|                                                                                 | 8409       | 0             | Output current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8414       | 0             | Active current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8419       | 0             | Unit utilization          | %                                    | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8424       | 0             | DC link voltage           | V                                    | 1 digit = 0.001 V                 |
|                                                                                 | 8429       | 0             | Operating hours           | h                                    | 1 digit = 1 min = 1/60 h          |
|                                                                                 | 8434       | 0             | Enable hours              | h                                    | 1 digit = 1 min = 1/60 h          |

| 0.. Display values                                                              |            |               |                           |                                      |                                   |
|---------------------------------------------------------------------------------|------------|---------------|---------------------------|--------------------------------------|-----------------------------------|
| 08. Fault memory                                                                |            |               |                           |                                      |                                   |
| Fault t-4: Background information for faults that occurred in the past when t-4 |            |               |                           |                                      |                                   |
| No.                                                                             | Index dec. | Subindex dec. | Name                      | Range/factory setting                | MOVILINK® scaling                 |
| 084                                                                             | 8370       | 0             | Error code                | Error code                           | –                                 |
|                                                                                 | 9308       | 0             | Fault subcode             | –                                    | –                                 |
|                                                                                 | 8887       | 0             | Internal error            | –                                    | –                                 |
|                                                                                 | 8375       | 0             | Status of digital inputs  | Bit field Bit 0, Bit 1, Bit 2, Bit 3 | –                                 |
|                                                                                 | 8385       | 0             | Status of digital outputs | Bit field Bit 0, Bit 1               | –                                 |
|                                                                                 | 8395       | 0             | Inverter status           | Text                                 | –                                 |
|                                                                                 | 8400       | 0             | Heat sink temperature     | °C                                   | 1 digit = 1 °C                    |
|                                                                                 | 8405       | 0             | Speed                     | min <sup>-1</sup>                    | 1 digit = 0.001 min <sup>-1</sup> |
|                                                                                 | 8410       | 0             | Output current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8415       | 0             | Active current            | %I <sub>N</sub>                      | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8420       | 0             | Unit utilization          | %                                    | 1 digit = 0.001% I <sub>N</sub>   |
|                                                                                 | 8425       | 0             | DC link voltage           | V                                    | 1 digit = 0.001 V                 |
|                                                                                 | 8430       | 0             | Operating hours           | h                                    | 1 digit = 1 min = 1/60 h          |
|                                                                                 | 8435       | 0             | Enable hours              | h                                    | 1 digit = 1 min = 1/60 h          |

| 0.. Display values  |             |               |                                          |                                                            |                                 |
|---------------------|-------------|---------------|------------------------------------------|------------------------------------------------------------|---------------------------------|
| 09. Bus diagnostics |             |               |                                          |                                                            |                                 |
| No.                 | Index dec.  | Subindex dec. | Name <sup>1)</sup>                       | Range/factory setting                                      | MOVILINK® scaling               |
| 094                 | 8455        | 0             | PO1 setpoint                             | hex                                                        | –                               |
| 095                 | 8456        | 0             | PO2 setpoint                             | hex                                                        | –                               |
| 096                 | 8457        | 0             | PO3 setpoint                             | hex                                                        | –                               |
| 097                 | 8458        | 0             | PI1 actual value                         | hex                                                        | –                               |
| 098                 | 8459        | 0             | PI2 actual value                         | hex                                                        | –                               |
| 099                 | 8460        | 0             | PI3 actual value                         | hex                                                        | –                               |
| –                   | 15801 Bit 0 | 0             | Stop requested <sup>2)</sup>             | Bit field                                                  | –                               |
| –                   | 15801 Bit 1 | 0             | Ramp limit requested <sup>1)</sup>       | Bit field                                                  | –                               |
| –                   | 15801 Bit 2 | 0             | Speed limitation requested <sup>1)</sup> | Bit field                                                  | –                               |
| –                   | 15801 Bit 7 | 0             | Limit active <sup>1)</sup>               | Bit field                                                  | –                               |
| –                   | 15802       | 0             | Maximum ramp time <sup>1)</sup>          | 0.01 – 10000 s<br>65535 digits (= not active)              | 1 digit = 0.001 s               |
| –                   | 15803       | 0             | Maximum speed CW <sup>1)</sup>           | 60 – 3800 min <sup>-1</sup><br>65535 digits (= not active) | 1 digit = 0.2 min <sup>-1</sup> |



| 0.. Display values  |            |               |                                 |                                                            |                                 |
|---------------------|------------|---------------|---------------------------------|------------------------------------------------------------|---------------------------------|
| 09. Bus diagnostics |            |               |                                 |                                                            |                                 |
| No.                 | Index dec. | Subindex dec. | Name <sup>1)</sup>              | Range/factory setting                                      | MOVILINK® scaling               |
| –                   | 15804      | 0             | Maximum speed CCW <sup>1)</sup> | 60 – 3800 min <sup>-1</sup><br>65535 digits (= not active) | 1 digit = 0.2 min <sup>-1</sup> |

1) PI = process input data word, PO = process output data word

2) Only in operation with safety option S12.

| 1.. Setpoints/ramp generators |            |               |                    |                                                  |                   |
|-------------------------------|------------|---------------|--------------------|--------------------------------------------------|-------------------|
| 13. Speed ramps 1             |            |               |                    |                                                  |                   |
| No.                           | Index dec. | Subindex dec. | Name               | Range/factory setting                            | MOVILINK® scaling |
| 130                           | 8807       | 0             | Ramp t11 up        | 0.1 – 1 – 2000 s                                 | 1 digit = 0.001 s |
| 131                           | 8808       | 0             | Ramp t11 down      | 0.1 – 1 – 2000 s                                 | 1 digit = 0.001 s |
| 134                           | 8474       | 0             | Ramp t12 up = down | 0.1 – 10 – 2000 s                                | 1 digit = 0.001 s |
| 135                           | 8475       | 0             | S pattern t12      | 0: Off<br>1: Level 1<br>2: Level 2<br>3: Level 3 | –                 |
| 136                           | 8476       | 0             | Stop ramp t13      | 0.1 – 0.2 – 1 s                                  | 1 digit = 0.001 s |

| 1.. Setpoints/ramp generators |            |               |                    |                                                  |                   |
|-------------------------------|------------|---------------|--------------------|--------------------------------------------------|-------------------|
| 14. Speed ramps 2             |            |               |                    |                                                  |                   |
| No.                           | Index dec. | Subindex dec. | Name               | Range/factory setting                            | MOVILINK® scaling |
| 140                           | 9264       | 0             | Ramp t21 up        | 0.1 – 1 – 2000 s                                 | 1 digit = 0.001 s |
| 141                           | 9265       | 0             | Ramp t21 down      | 0.1 – 1 – 2000 s                                 | 1 digit = 0.001 s |
| 144                           | 8482       | 0             | Ramp t22 up = down | 0.1 – 10 – 2000 s                                | 1 digit = 0.001 s |
| 145                           | 8483       | 0             | S pattern t22      | 0: OFF<br>1: Level 1<br>2: Level 2<br>3: Level 3 | –                 |
| 146                           | 8484       | 0             | Stop ramp t23      | 0.1 – 0.2 – 1 s                                  | 1 digit = 0.001 s |

| 3.. Motor parameters |            |               |                    |                                   |                                   |
|----------------------|------------|---------------|--------------------|-----------------------------------|-----------------------------------|
| 30. Limits 1         |            |               |                    |                                   |                                   |
| No.                  | Index dec. | Subindex dec. | Name               | Range/factory setting             | MOVILINK® scaling                 |
| 300                  | 8515       | 0             | Start/stop speed 1 | 0 – 150 min <sup>-1</sup>         | 1 digit = 0.001 min <sup>-1</sup> |
| 301                  | 8516       | 0             | Minimum speed 1    | 0 – 60 – 6000 min <sup>-1</sup>   | 1 digit = 0.001 min <sup>-1</sup> |
| 302                  | 8517       | 0             | Maximum speed 1    | 0 – 3000 – 6000 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |
| 303                  | 8518       | 0             | Current limit 1    | 0 – 160% I <sub>N</sub>           | 1 digit = 0.001% I <sub>N</sub>   |

| 3.. Motor parameters |            |               |                    |                                   |                                   |
|----------------------|------------|---------------|--------------------|-----------------------------------|-----------------------------------|
| 31. Limits 2         |            |               |                    |                                   |                                   |
| No.                  | Index dec. | Subindex dec. | Name               | Range/factory setting             | MOVILINK® scaling                 |
| 310                  | 8519       | 0             | Start/stop speed 2 | 0 – 150 min <sup>-1</sup>         | 1 digit = 0.001 min <sup>-1</sup> |
| 311                  | 8520       | 0             | Minimum speed 2    | 0 – 60 – 6000 min <sup>-1</sup>   | 1 digit = 0.001 min <sup>-1</sup> |
| 312                  | 8521       | 0             | Maximum speed 2    | 0 – 3000 – 6000 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |
| 313                  | 8522       | 0             | Current limit 2    | 0 – 160% I <sub>N</sub>           | 1 digit = 0.001% I <sub>N</sub>   |

| 3.. Motor parameters   |            |               |                        |                       |                   |
|------------------------|------------|---------------|------------------------|-----------------------|-------------------|
| 32. Motor adjustment 1 |            |               |                        |                       |                   |
| No.                    | Index dec. | Subindex dec. | Name                   | Range/factory setting | MOVILINK® scaling |
| 320                    | 8523       | 0             | Automatic adjustment 1 | 0: Off<br>1: On       | –                 |
| 321                    | 8524       | 0             | Boost 1                | 0 – 100%              | 1 digit = 0.001%  |
| 322                    | 8525       | 0             | IxR adjustment 1       | 0 – 100%              | 1 digit = 0.001%  |
| 323                    | 8526       | 0             | Premagnetization 1     | 0 – 2000 ms           | 1 digit = 0.001 s |

21361797/EN – 12/2015

| 3.. Motor parameters   |            |               |                                              |                               |                                   |
|------------------------|------------|---------------|----------------------------------------------|-------------------------------|-----------------------------------|
| 32. Motor adjustment 1 |            |               |                                              |                               |                                   |
| No.                    | Index dec. | Subindex dec. | Name                                         | Range/factory setting         | MOVILINK® scaling                 |
| 324                    | 8527       | 0             | Slip compensation 1                          | 0 – 500 min <sup>-1</sup>     | 1 digit = 0.001 min <sup>-1</sup> |
| 325                    | 8834       | 0             | No-load vibration damping for drives 1 and 2 | <b>0: Off</b><br><b>1: On</b> | –                                 |

| 3.. Motor parameters   |            |               |                        |                               |                                   |
|------------------------|------------|---------------|------------------------|-------------------------------|-----------------------------------|
| 33. Motor adjustment 2 |            |               |                        |                               |                                   |
| No.                    | Index dec. | Subindex dec. | Name                   | Range/factory setting         | MOVILINK® scaling                 |
| 330                    | 8528       | 0             | Automatic adjustment 2 | <b>0: Off</b><br><b>1: On</b> | –                                 |
| 331                    | 8529       | 0             | Boost 2                | 0 – 100%                      | 1 digit = 0.001%                  |
| 332                    | 8530       | 0             | IxR adjustment 2       | 0 – 100%                      | 1 digit = 0.001%                  |
| 333                    | 8531       | 0             | Premagnetization 2     | 0 – 2000 ms                   | 1 digit = 0.001 s                 |
| 334                    | 8532       | 0             | Slip compensation 2    | 0 – 500 min <sup>-1</sup>     | 1 digit = 0.001 min <sup>-1</sup> |

| 3.. Motor parameters   |            |               |                             |                                                  |                   |
|------------------------|------------|---------------|-----------------------------|--------------------------------------------------|-------------------|
| 34. Motor protection 1 |            |               |                             |                                                  |                   |
| No.                    | Index dec. | Subindex dec. | Name                        | Range/factory setting                            | MOVILINK® scaling |
| 340                    | 8533       | 0             | Motor protection drive 1    | <b>0: Off</b><br><b>1: On</b>                    | –                 |
| 341                    | 8534       | 0             | Cooling type 1              | <b>0: Fan cooled</b><br><b>1: Forced cooling</b> | –                 |
| 342                    | 8535       | 0             | Motor protection drive 2    | <b>0: Off</b><br><b>1: On</b>                    | –                 |
| 343                    | 8536       | 0             | Cooling type 2              | <b>0: Fan cooled</b><br><b>1: Forced cooling</b> | –                 |
| 347                    | 10096      | 32            | Motor cable length 1        | 0 – 15 m                                         | 1 digit = 1 m     |
| 348                    | 10096      | 37            | Motor cable length 2        | 0 – 15 m                                         | 1 digit = 1 m     |
| –                      | 10465      | 100           | Ambient motor temperature 1 | -30 – <b>30</b> – 80 °C                          | 1 digit = 1 °C    |
| –                      | 10465      | 101           | Ambient motor temperature 2 | -30 – <b>30</b> – 80 °C                          | 1 digit = 1 °C    |
| –                      | 8323       | 0             | Motor utilization 1         | %                                                | 1 digit = 0.001%  |
| –                      | 8324       | 0             | Motor utilization 2         | %                                                | 1 digit = 0.001%  |

| 5.. Control functions |            |               |                    |                                               |                   |
|-----------------------|------------|---------------|--------------------|-----------------------------------------------|-------------------|
| 50. Speed monitoring  |            |               |                    |                                               |                   |
| No.                   | Index dec. | Subindex dec. | Name               | Range/factory setting                         | MOVILINK® scaling |
| 500                   | 8557       | 0             | Speed monitoring 1 | <b>0: Off</b><br><b>3: Motor/regenerative</b> | –                 |
| 501                   | 8558       | 0             | Delay time 1       | 0.1 – <b>1</b> – 10 s                         | 1 digit = 0.001 s |
| 502                   | 8559       | 0             | Speed monitoring 2 | <b>0: Off</b><br><b>3: Motor/regenerative</b> | –                 |
| 503                   | 8560       | 0             | Delay time 2       | 0.1 – <b>1</b> – 10 s                         | 1 digit = 0.001 s |

| 5.. Control functions    |            |               |                                        |                                                                                      |                   |
|--------------------------|------------|---------------|----------------------------------------|--------------------------------------------------------------------------------------|-------------------|
| 53. Mains OFF monitoring |            |               |                                        |                                                                                      |                   |
| No.                      | Index dec. | Subindex dec. | Name                                   | Range/factory setting                                                                | MOVILINK® scaling |
| 522                      | 8927       | 0             | Line phase failure check <sup>1)</sup> | <b>0: Off</b><br><b>1: On</b>                                                        | –                 |
| 523                      | 10096      | 26            | Mains OFF monitoring                   | <b>0: Operation on three-phase mains supply</b><br><b>1: Operation on MOVITRANS®</b> | –                 |

1) Deactivating the line phase failure check in unfavorable operating conditions can damage the unit.

| 5.. Control functions |            |               |              |                       |                   |
|-----------------------|------------|---------------|--------------|-----------------------|-------------------|
| 59. Identification    |            |               |              |                       |                   |
| No.                   | Index dec. | Subindex dec. | Name         | Range/factory setting | MOVILINK® scaling |
| 590                   | 10537      | 1             | Localization | 0: Off<br>1: On       | –                 |

| 6.. Terminal assignment                                  |            |               |                     |                                                                  |                   |
|----------------------------------------------------------|------------|---------------|---------------------|------------------------------------------------------------------|-------------------|
| 60. Digital inputs (only in "SBus slave" operating mode) |            |               |                     |                                                                  |                   |
| No.                                                      | Index dec. | Subindex dec. | Name                | Range/factory setting                                            | MOVILINK® scaling |
| 600                                                      | 8335       | 0             | digital input DI100 | 0: No function<br>11: External fault 0 active<br>12: Error reset | –                 |
| 601                                                      | 8336       | 0             | digital input DI101 |                                                                  |                   |
| 602                                                      | 8337       | 0             | digital input DI102 |                                                                  |                   |
| 603                                                      | 8338       | 0             | digital input DI103 |                                                                  |                   |

| 6.. Terminal assignment |            |               |                     |                                                                                                                                                            |                   |
|-------------------------|------------|---------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 62. Digital outputs     |            |               |                     |                                                                                                                                                            |                   |
| No.                     | Index dec. | Subindex dec. | Name                | Range/factory setting                                                                                                                                      | MOVILINK® scaling |
| 620                     | 8350       | 0             | digital output DB00 | 0: No function<br>2: Ready for operation<br>3: Output stage on<br>4: Rotating field on<br>5: <b>Brake released</b><br>6: Brake applied<br>7: Parameter set | –                 |

| 7.. Control functions |            |               |                  |                                                                                                         |                   |
|-----------------------|------------|---------------|------------------|---------------------------------------------------------------------------------------------------------|-------------------|
| 70. Operating modes   |            |               |                  |                                                                                                         |                   |
| No.                   | Index dec. | Subindex dec. | Name             | Range/factory setting                                                                                   | MOVILINK® scaling |
| 700                   | 8574       | 0             | Operating mode 1 | 0: VFC<br>2: VFC & hoist<br>3: VFC & DC braking<br>21: V/f characteristic curve<br>22: V/f & DC braking | –                 |
| 701                   | 8575       | 0             | Operating mode 2 |                                                                                                         |                   |

| 7.. Control functions  |            |               |                      |                          |                                   |
|------------------------|------------|---------------|----------------------|--------------------------|-----------------------------------|
| 71. Standstill current |            |               |                      |                          |                                   |
| No.                    | Index dec. | Subindex dec. | Name                 | Range/factory setting    | MOVILINK® scaling                 |
| 710                    | 8576       | 0             | Standstill current 1 | 0 – 50% I <sub>Mot</sub> | 1 digit = 0.001% I <sub>Mot</sub> |
| 711                    | 8577       | 0             | Standstill current 2 | 0 – 50% I <sub>Mot</sub> | 1 digit = 0.001% I <sub>Mot</sub> |

| 7.. Control functions      |            |               |                          |                                |                                   |
|----------------------------|------------|---------------|--------------------------|--------------------------------|-----------------------------------|
| 72. Setpoint stop function |            |               |                          |                                |                                   |
| No.                        | Index dec. | Subindex dec. | Name                     | Range/factory setting          | MOVILINK® scaling                 |
| 720                        | 8578       | 0             | Setpoint stop function 1 | 0: Off<br>1: On                | –                                 |
| 721                        | 8579       | 0             | Stop setpoint 1          | 0 – 30 – 500 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |
| 722                        | 8580       | 0             | Start offset 1           | 0 – 30 – 500 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |
| 723                        | 8581       | 0             | Setpoint stop function 2 | 0: Off<br>1: On                | –                                 |
| 724                        | 8582       | 0             | Stop setpoint 2          | 0 – 30 – 500 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |
| 725                        | 8583       | 0             | Start offset 2           | 0 – 30 – 500 min <sup>-1</sup> | 1 digit = 0.001 min <sup>-1</sup> |

| 7.. Control functions |            |               |                          |                       |                   |
|-----------------------|------------|---------------|--------------------------|-----------------------|-------------------|
| 73. Brake function    |            |               |                          |                       |                   |
| No.                   | Index dec. | Subindex dec. | Name                     | Range/factory setting | MOVILINK® scaling |
| 731                   | 8749       | 0             | Brake release time 1     | 0 – 2000 ms           | 1 digit = 0.001 s |
| 732                   | 8585       | 0             | Brake application time 1 | 0 – 100 – 2000 ms     | 1 digit = 0.001 s |

| 7.. Control functions |            |               |                                               |                                                                                                                         |                   |
|-----------------------|------------|---------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------|
| 73. Brake function    |            |               |                                               |                                                                                                                         |                   |
| No.                   | Index dec. | Subindex dec. | Name                                          | Range/factory setting                                                                                                   | MOVILINK® scaling |
| 734                   | 8750       | 0             | Brake release time 2                          | 0 – 2000 ms                                                                                                             | 1 digit = 0.001 s |
| 735                   | 8587       | 0             | Brake application time 2                      | 0 – <b>100</b> – 2000 ms                                                                                                | 1 digit = 0.001 s |
| 738                   | 8893       | 0             | Activate "Brake release without drive enable" | 0: Off<br>1: On                                                                                                         | –                 |
| –                     | 10076      | 17            | Option brake 1                                | 0: SEW brake<br>1: Third-party brake (binary 24 V control signal)<br>2: No brake<br>3: Third-party brake const. Voltage | –                 |
|                       |            | 117           | Option brake 2                                |                                                                                                                         |                   |
| –                     | 10076      | 10            | Constant DC voltage 1 <sup>1)</sup>           | 40 – 250 V DC                                                                                                           | 1 digit = 1 V     |
|                       |            | 110           | Constant DC voltage 2 <sup>1)</sup>           | 40 – 250 V DC                                                                                                           | 1 digit = 1 V     |

1) Only for MOVIFIT® FC with constant voltage brake.

| 7.. Control functions      |            |               |                        |                       |                   |
|----------------------------|------------|---------------|------------------------|-----------------------|-------------------|
| 77. Energy-saving function |            |               |                        |                       |                   |
| No.                        | Index dec. | Subindex dec. | Name                   | Range/factory setting | MOVILINK® scaling |
| 770                        | 8925       | 0             | Energy-saving function | 0: Off<br>1: On       | –                 |

| 8.. Unit functions |            |               |                 |                                           |                   |
|--------------------|------------|---------------|-----------------|-------------------------------------------|-------------------|
| 80. Setup          |            |               |                 |                                           |                   |
| No.                | Index dec. | Subindex dec. | Name            | Range/factory setting                     | MOVILINK® scaling |
| 802                | 8594       | 0             | Factory setting | 0: No<br>1: Standard<br>2: Delivery state | –                 |
| 803                | 8595       | 0             | Parameter lock  | 0: Off<br>1: On                           | –                 |

| 8.. Unit functions       |            |               |                                |                                                    |                   |
|--------------------------|------------|---------------|--------------------------------|----------------------------------------------------|-------------------|
| 81. Serial communication |            |               |                                |                                                    |                   |
| No.                      | Index dec. | Subindex dec. | Name                           | Range/factory setting                              | MOVILINK® scaling |
| 813                      | 8600       | 0             | SBus address (display value)   | –                                                  | –                 |
| 816                      | 8603       | 0             | SBus baud rate (display value) | 0: 125 kBd<br>1: 250 kBd<br>2: 500 kBd<br>3: 1 MBd | –                 |

| 8.. Unit functions  |            |               |                          |                                                                                                                             |                   |
|---------------------|------------|---------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------|
| 83. Fault responses |            |               |                          |                                                                                                                             |                   |
| No.                 | Index dec. | Subindex dec. | Name                     | Range/factory setting                                                                                                       | MOVILINK® scaling |
| 830                 | 8609       | 0             | External fault response  | 2: Immediate stop/fault<br>4: Rapid stop/fault<br>7: Rapid stop/warning<br>11: Normal stop/warning<br>12: Normal stop/fault | –                 |
| 835                 | 8616       | 0             | TF signal response       |                                                                                                                             |                   |
| 836                 | 8615       | 0             | Response to SBus timeout |                                                                                                                             |                   |

| 8.. Unit functions |            |               |              |                       |                   |
|--------------------|------------|---------------|--------------|-----------------------|-------------------|
| 84. Reset behavior |            |               |              |                       |                   |
| No.                | Index dec. | Subindex dec. | Name         | Range/factory setting | MOVILINK® scaling |
| 840                | 8617       | 0             | Manual reset | 0: No<br>1: Yes       | –                 |

| 8.. Unit functions |            |               |                 |                       |                   |
|--------------------|------------|---------------|-----------------|-----------------------|-------------------|
| 86. Modulation     |            |               |                 |                       |                   |
| No.                | Index dec. | Subindex dec. | Name            | Range/factory setting | MOVILINK® scaling |
| 860                | 8620       | 0             | PWM frequency 1 | 0: 4 kHz              | –                 |
| 861                | 8621       | 0             | PWM frequency 2 | 1: 8 kHz<br>3: 16 kHz |                   |

| 8.. Unit functions                           |            |               |                              |                                                                                                                                                                                                         |                   |
|----------------------------------------------|------------|---------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 87. Process data assignment (display values) |            |               |                              |                                                                                                                                                                                                         |                   |
| No.                                          | Index dec. | Subindex dec. | Name <sup>1)</sup>           | Range/factory setting                                                                                                                                                                                   | MOVILINK® scaling |
| 870                                          | 8304       | 0             | Setpoint description PO1     | 0: <b>Control word</b>                                                                                                                                                                                  | –                 |
| 871                                          | 8305       | 0             | Setpoint description PO2     | 1: Setpoint speed in min <sup>-1</sup><br>11: Setpoint speed in %n <sub>max</sub>                                                                                                                       | –                 |
| 872                                          | 8306       | 0             | Setpoint description PO3     | 0: No function<br>1: Setpoint speed in min <sup>-1</sup><br>5: Maximum speed in min <sup>-1</sup><br>8: <b>Ramp</b><br>11: Setpoint speed in min <sup>-1</sup>                                          | –                 |
| 873                                          | 8307       | 0             | Actual value description PI1 | 6: Status word 1                                                                                                                                                                                        | –                 |
| 874                                          | 8308       | 0             | Actual value description PI2 | 1: Actual speed in min <sup>-1</sup><br>2: <b>Apparent output current</b><br>3: Active output current<br>8: Actual speed in %n <sub>max</sub>                                                           | –                 |
| 875                                          | 8309       | 0             | Actual value description PI3 | 0: No function<br>1: Actual speed in min <sup>-1</sup><br>2: Apparent output current<br>3: Active output current<br>6: Status word 1<br>7: <b>Status word 2</b><br>8: Actual speed in %n <sub>max</sub> | –                 |
| 876                                          | 8622       | 0             | PO data enable               | 0: No<br>1: <b>Yes</b>                                                                                                                                                                                  | –                 |
| –                                            | 15802      | 0             | Maximum ramp time            | 0 – 10 s                                                                                                                                                                                                | 1 digit = 0.001 s |
| –                                            | 15803      | 0             | Maximum speed CW             | 0 – 3800 min                                                                                                                                                                                            | 1 digit = 0.001 s |
| –                                            | 15804      | 0             | Maximum speed CCW            | 0 – 3800 min                                                                                                                                                                                            | 1 digit = 0.001 s |

1) PI = process input data word, PO = process output data word

## 13.6 Parameter description for MOVIFIT® FC

### 13.6.1 0.. Display values

#### Parameter 000 – Speed

Calculated actual speed (signed).

#### Parameter 002 – Frequency

Output frequency of the frequency inverter (signed).

#### Parameter 004 – Output current

Apparent current in the range 0 – 200% of the nominal unit current.

#### Parameter 005 – Active current

Active current in range -200% – +200% of the nominal unit current (signed).

The sign of the active current depends on the direction of rotation and the type of load:

| Direction of rotation     | Load         | Speed                | Active current         |
|---------------------------|--------------|----------------------|------------------------|
| Clockwise rotation        | Motor        | Positive ( $n > 0$ ) | Positive ( $I_w > 0$ ) |
|                           | Regenerative |                      | Negative ( $I_w < 0$ ) |
| Counterclockwise rotation | Motor        | Negative ( $n < 0$ ) | Negative ( $I_w < 0$ ) |
|                           | Regenerative |                      | Positive ( $I_w > 0$ ) |

#### Parameter 006/007 – Motor utilization 1/2

Motor utilization in %, calculated using a motor temperature model.

#### Parameter 008 – DC link voltage

Voltage in V measured in the DC link.

#### Parameter 009 – Output current

Apparent current in A.

#### Parameter 010 – Inverter status

The output stage can have the following states:

- Disabled
- Enabled

**Parameter 011 – Operating state**

The following operating states are possible:

- 24 V operation
- Controller inhibit
- No enable
- Standstill current
- Enable
- Factory setting
- Fault

**Parameter 012 – Fault status**

Fault status in text form.

**Parameter 013 – Current parameter set**

Displays parameter set 1 or 2.

**Parameter 014 – Heat sink temperature**

Heat sink temperature of the unit.

**Parameter 015 – DIP switch setting S10**

Display of DIP switch setting S10.

| DIP switch | Bit in index<br>10087.135 | Functionality         |                                                              |
|------------|---------------------------|-----------------------|--------------------------------------------------------------|
| S10/1      | Bit 2                     | Startup mode          | 0: Easy mode<br>1: Expert mode                               |
| S10/2      | Bit 3                     | Operating mode        | 0: VFC control<br>1: V/f control                             |
| S10/3      | Bit 4                     | Brake type            | 0: Standard brake<br>1: Optional brake                       |
| S10/4      | Bit 5                     | Motor connection type | 0: Star<br>1: Delta                                          |
| S10/5      | Bit 6                     | Motor power rating    | 0: Motor adjusted<br>1: Motor power rating one stage smaller |
| S10/6      | Bit 7                     | VFC & hoist           | 0: Off, S10/2 active<br>1: VFC & hoist                       |

**Parameter 016 – Power-applied hours**

The total of hours in which the unit was connected to the external DC 24 V supply.

**Parameter 017 – Enable hours**

The total of hours in which the output stage of the unit was enabled.

**Parameter 031 to 034 – Setting/assignment of digital input DI100 to DI103**

Display of the status of digital input DI100 to DI103 (only in "SBus slave" operating mode).

**Parameter 050 – Setting/assignment of digital output DB00**

Display of the status of digital output DB00.

**Parameter 070 – Unit type**

Display of the unit type and the unit series.

**Parameter 071 – Nominal output current**

Nominal unit current in A.

**Parameter 076 – Basic unit firmware**

Part number, version and signature of the basic unit firmware.

**Parameter 700/701 – Operating mode 1/2**

Display of the operating mode of the frequency inverter.

**Parameter set 07. – Current motor data parameter set 1/2**

Display of motor data for parameter set 1/2.

**Parameters 080 to 084 – Faults t-0 to t-4**

The unit saves the diagnostic data when a fault occurs. The last 5 errors are displayed in the error memory.

**Parameter 094 to 096 – PO1 to PO3 setpoint**

Process output data word 1 to 3.

**Parameter 097 to 099 – PI1 bis PI3 actual value**

Process input data word 1 to 3.

**Parameter index 15801 Bit 0 – Stop requested**

The parameter is not assigned to a parameter number.

Displays if the safety option is currently requesting a stop of the drive.

**Parameter index 15801 Bit 1 – Ramp limit requested**

The parameter is not assigned to a parameter number.

Displays if the safety option is currently requesting a limitation of the ramp time for a deceleration ramp.

**Parameter index 15801 Bit 2 – Speed limitation requested**

The parameter is not assigned to a parameter number.

Displays if the safety option is currently requesting a speed limitation.



**Parameter index 15801 Bit 7 – Limitation active**

The parameter is not assigned to a parameter number.

Displays if the limitations that the safety option is currently requesting (stop, speed limitation, ramp limitation) affect the current bus setpoints.

In the following cases, the bit is not set:

- The current bus setpoints are within the limitations requested by the safety option.
- The stop requested by the safety option is already requested by the bus setpoints.

**Parameter index 15802 – Maximum ramp time**

The parameter is not assigned to a parameter number.

Shows the current value of the ramp time limitation requested by the safety option.

**Parameter index 15803 – Maximum speed CW**

The parameter is not assigned to a parameter number.

Shows the current value of the speed limitation in clockwise rotation requested by the safety option.

**Parameter index 15804 – Maximum speed CCW**

The parameter is not assigned to a parameter number.

Shows the current value of the speed limitation in counterclockwise rotation requested by the safety option.

**13.6.2 1.. Setpoint/ramp generators****Parameter 130/140 – Ramp t11/t21 up**

Acceleration ramp.

The ramp time refers to a setpoint step change of 1500 1/min.

**Parameter 131/141 – Ramp t11/t21 down**

Deceleration ramp.

The ramp time refers to a setpoint step change of 1500 1/min.

**Parameter 134/144 – Ramp t11/t21 up = down**

The ramp time sets the acceleration and deceleration ramp if the *S pattern t12/t22* parameter has been set to grade 1, grade 2 or grade 3.

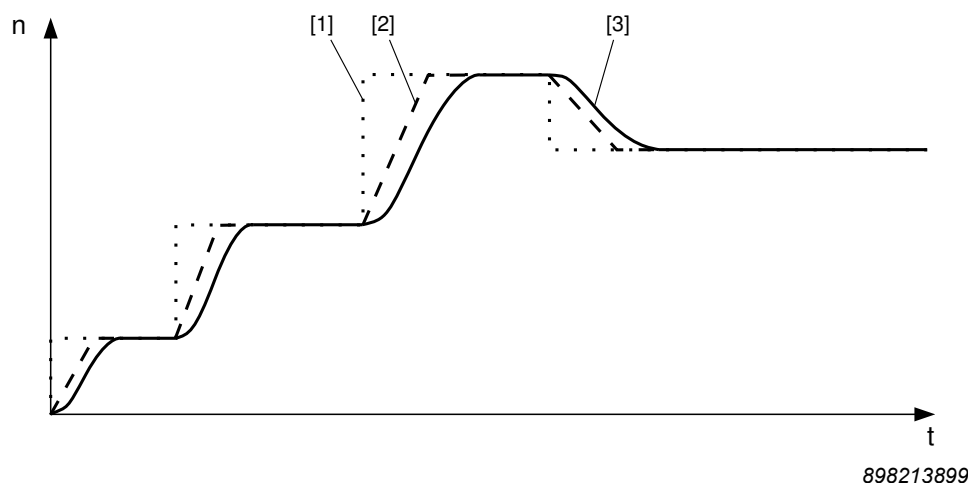
The ramp time refers to a setpoint step change of 1500 1/min.

If the *P135/145 – S pattern t12/t22* parameter is activated, the ramp time cannot be specified via the process data.

**Parameter 135/145 – S pattern t12/t22**

Determines the pattern grade (1 = low, 2 = medium, 3 = high) of the ramp. The S pattern is used for rounding off the ramp and allows for a soft acceleration of the drive in the event of a setpoint change.

The following figure shows the effect of the S pattern:



- [1] Setpoint specification
- [2] Speed without S pattern
- [3] Speed with S pattern

If the *P135/145 – S pattern t12/t22* parameter is activated, the ramp time cannot be specified via the process data.

**Parameter 136/146 – Stop ramp t13/t23**

Takes effect in the following cases:

- For faults that are set to stop at the stop ramp when a fault occurs.
- When the stop ramp is selected using the corresponding bit in the process data.

The ramp time refers to a setpoint step change of 1500 1/min.

### 13.6.3 3.. Motor parameters

#### Parameter 300/310 – Start-stop speed 1/2

The start speed determines the slowest speed at which the motor is to start after enable. The transition to the setpoint speed is then made using the active acceleration ramp.

The stop speed determines the speed at which the motor stops after enable is revoked at the ramp. The brake is applied afterwards.

#### Parameter 301/311 – Minimum speed 1/2

Defines the minimum speed  $n_{\min}$  of the drive.

Even if the specified speed setpoint is smaller than the minimum speed, the drive does not fall below this speed value.

#### Parameter 302/312 – Maximum speed 1/2

Defines the maximum speed  $n_{\max}$  of the drive.

Even if the specified speed setpoint is larger than the maximum speed, the drive does not exceed this speed value.

If  $n_{\min} > n_{\max}$ , the value set in  $n_{\min}$  applies to the minimum speed and the maximum speed.

#### Parameter 303/313 – Current limit 1/2

The internal current limitation is based on the apparent current. The inverter automatically decreases the current limit to provide stall protection for the connected motor in the field weakening range.

#### Parameter 320/330 – Automatic adjustment 1/2

When the parameter is activated, the motor is calibrated each time the operating status changes to "Enable".

#### Parameter 321/331 – Boost 1/2

If parameter *P320/P330 – Automatic adjustment 1/2* is activated, the inverter sets parameter *P321/P331 Boost 1/2* automatically. This parameter does not usually have to be set manually.

In exceptional cases, manual setting may be necessary to increase the breakaway torque.

#### Parameter 322/332 – IxR adjustment 1/2

If parameter *P320/P330 – Automatic adjustment 1/2* is activated, the inverter sets parameter *P322/P332 – IxR adjustment 1/2* automatically. Only specialists are permitted to change this parameter manually to optimize the settings.

#### Parameter 323/333 – Premagnetization 1/2

Allows for a magnetic field to be built up in the motor when the inverter is enabled.

**Parameter 324/334 – Slip compensation 1/2**

Increases the speed accuracy of the motor. Enter the nominal slip of the connected motor manually.

The slip compensation is designed for a ratio smaller than 10 for load moment of inertia to motor moment of inertia. If control starts oscillating, you must reduce the slip compensation or set it to "0", if required.

**Parameter 325 – No-load vibration damping**

No-load vibration damping can be activated when the motor tends to be unstable under no load conditions.

**Parameter 340/342 – Motor protection 1/2**

Activates or deactivates the thermal protection model for drive 1/2.

When this function is activated, the MOVIFIT® unit takes over the thermal protection of the drive 1/2 by electronic means.

**Parameter 341/343 – Type of cooling 1/2**

Type of cooling (integrated fan, forced cooling fan) which forms the basis for calculating the motor temperature.

**Parameter 347/348 – Motor cable length 1/2**

Cable length of the SEW-EURODRIVE hybrid cable between frequency inverter and motor which forms the basis for calculating the motor temperature. This parameter must only be changed if the unit is installed close to the motor.

**Parameter index 10465 – Ambient motor temperature 1/2**

The parameter is not assigned to a parameter number.

Use the mean ambient temperature of the motor in °C to set the value for this parameter.

**Parameter index 8323/8324 – Motor utilization 1/2**

The parameter is not assigned to a parameter number.

Shows the current thermal utilization of the motor in %.

#### 13.6.4 5.. Control functions

##### Parameter 500/502 – Speed monitoring 1/2

Speed monitoring is performed by evaluating operation at the current limit. If the current limit is reached permanently for the duration of the set delay time, the speed monitoring trips.

##### Parameter 501/503 – Delay time 1/2

Prevents the speed monitoring from responding too sensitively.

The set current limit can be reached during acceleration, deceleration, or load peaks. The current limit must be reached permanently for the duration of the delay time before the monitoring function trips.

##### Parameter 522 – Line phase failure check

Deactivation of this monitoring function prevents the line phase failure check from triggering with asymmetrical supply systems.

#### NOTICE

Damages to the unit by deactivating the line phase failure check in unfavorable operating conditions.

Damages to the unit.

- Do not deactivate the mains phase failure monitoring.

##### Parameter 523 – Mains off check

Adjusts the mains off check of the frequency inverter to the operation with MOVITRANS®.

##### Parameter 590 – Localization

Localizes the MOVIFIT® unit in the plant.

The RUN/PS LED of the MOVIFIT® unit blinks green/red/green when the localization function is active. The MOVIFIT® unit automatically deactivates the localization function after 5 minutes.

#### 13.6.5 6.. Terminal assignment

##### Parameter 600 to 603 – Digital inputs DI100 to DI103 (only in "SBus slave" unit design)

| Setting            | "0" signal                         | "1" signal                         |
|--------------------|------------------------------------|------------------------------------|
| 0: No function     | –                                  | –                                  |
| 11: External fault | External fault                     | –                                  |
| 12: Error reset    | Reset on positive edge from 0 to 1 | Reset on positive edge from 0 to 1 |

##### Parameter 620 – Digital output DB00



#### ▲ WARNING

Unexpected plant behavior if the digital outputs DB00 or DB01 are used for controlling the brake and parameters are incorrectly set.

Fatal or severe injuries and damage to property.

- If the DB00 and DB01 digital outputs are used for controlling the brake, set parameter *P620/621* to "brake released" and make sure that the parameter setting will not be changed again.
- Before you use digital outputs to control the brake, check the parameter settings.



#### ▲ WARNING

If no rotating field is generated due to the parameter setting, line voltage may still be present at the MOVIFIT® unit or the connected drives.

Severe or fatal injuries from electric shock.

- Disconnect the unit from the power supply before you perform any work on the unit.

| Setting                | "0" signal                 | "1" signal                    |
|------------------------|----------------------------|-------------------------------|
| 0: No function         | –                          | –                             |
| 2: Ready for operation | Not ready                  | Ready for operation           |
| 3: Output stage on     | Unit inhibited             | Unit enabled, motor energized |
| 4: Rotating field on   | No rotating field          | Rotating field                |
| 5: Brake released      | Brake applied              | Brake released                |
| 6: Brake applied       | Brake released             | Brake applied                 |
| 8: Parameter set 2     | Parameter set 1 is active. | Parameter set 2 is active.    |

### 13.6.6 7.. Control functions

#### Parameter 700/701 – Operating mode 1/2

Sets the general operating mode of the frequency inverter.

- **VFC / V/f characteristic curve**

Default setting for asynchronous motors. This setting is suitable for general applications such as conveyor belts, trolleys, etc.

- **VFC & hoist**

The hoist function automatically provides all functions necessary for operating a simple lifting application. For the hoist function to be performed correctly, the motor brake must be controlled using the frequency inverter.

- **VFC & DC braking/V/f & DC braking**

This setting means the asynchronous motor brakes by using current injection. The motor brakes without a braking resistor on the frequency inverter.

**▲ DANGER!** Danger due to uncontrolled braking. With DC braking, guided stops are not possible and certain ramp values cannot be observed. Fatal or severe injuries and damage to property. Use a different operating mode.

#### Parameter 710/711 – Standstill current 1/2



#### ▲ WARNING

Danger of electric shock due to standstill current during a communication timeout. As standard, a communication timeout does not interrupt the standstill current. Whether the current is interrupted in the event of an error depends on the parameterized error response.

Severe or fatal injuries.

- Disconnect the MOVIFIT® unit from the mains using an appropriate external disconnecting device, and secure it against unintentional restart.
- Then wait at least one minute before opening the wiring space of the MOVIFIT® unit or the connected drive, or touching the plug connector contacts.

When the standstill current function is activated, the frequency inverter injects a current in the motor at standstill.

The standstill current fulfills the following functions:

- Prevents the risk of condensation at the motor and freezing of the brake when the ambient temperature is low.  
Set the current level in such a way that the motor will not overheat.
- Allows to enable the motor without premagnetization.
- Allows that the output stage remains enabled to inject the motor standstill current even in "No enable" status. Changing parameter sets is not possible.

In case of error, the motor is no longer energized.

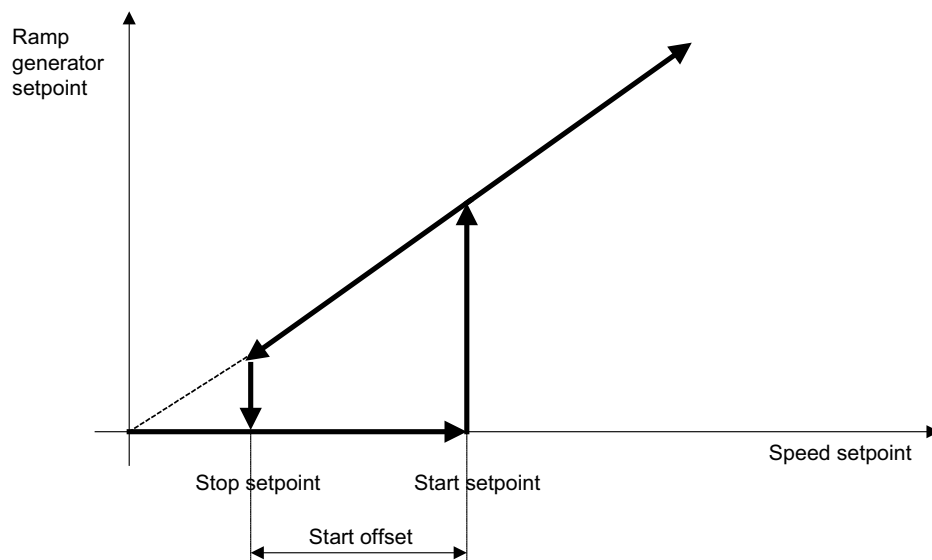
### Parameter 720/723 – Setpoint stop function 1/2, 721/724 – Stop setpoint 1/2, 722/725 – Start offset 1/2

If the setpoint stop function is activated, the frequency inverter is enabled in the following case:

$Speed\ setpoint > (stop\ setpoint + start\ offset)$

Inverter enable is revoked in the following case:

$Speed\ setpoint < stop\ setpoint$



9007200047651083

### Parameter 731/734 – Brake release time 1/2

Defines how long the motor is to run at minimum speed after premagnetization ends. This time is necessary for opening the brake completely.

### Parameter 732/735 – Brake application time 1/2

The time required for the mechanical brake to apply.

### Parameter 738 – Activate brake release without drive enable

If this parameter is set to "On" you can release the brake without drive enable.

The brake is always applied when the unit is not ready for operation.

This functionality is not available in the following cases:

- The motor brake is not controlled by the frequency inverter.
- In case of the hoist function.



**Parameter index 10076, subindex 17/117 – Option brake 1/2**

The parameter is not assigned to a parameter number.

This parameter index can only be changed if the output stage of the MOVIFIT® FC frequency inverter is not enabled.

Activates the brake function for parameter set 1/2.

| Setting                             | Meaning                                                                                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 0: SEW brake                        | MOVIFIT® FC controls an SEW-EURODRIVE brake.                                                                                                       |
| 1: Third-party brake                | MOVIFIT® FC controls a brake via the digital output DB00 (DC 24 V). The parameter <i>P620 – digital output DB00</i> is set to "5: brake released". |
| 2: No brake                         | MOVIFIT® FC controls no brake.                                                                                                                     |
| 3: Third-party brake const. voltage | MOVIFIT® FC controls a brake with constant voltage.                                                                                                |

**Parameter index 10076, subindex 10/110 – Constant DC voltage 1/2**

The parameter is not assigned to a parameter number.

Determines the constant voltage for controlling the constant voltage brake for parameter set 1/2.

This parameter index can only be changed if the output stage of the MOVIFIT® FC frequency inverter is not enabled.

The constant voltage brake is only controlled if the parameter index is set to "3: Third-party brake const. voltage" (default value = DC 0 V).

**Parameter 770 – Energy-saving function**

If this parameter is set to "On", the frequency inverter reduces the no-load current.

**13.6.7 8.. Unit functions****Parameter 802 – Factory setting**

If this parameter is set to "delivery state" all parameters, that have a factory setting value and cannot be set via DIP switch S10, are reset to the factory setting value.

The following parameters that can be set in Easy mode using DIP switch S10, the DIP switch setting is activated when the factory setting "delivery state" is selected.

- Parameter 700 – *Operating mode*
- Motor type
- Motor connection type
- Motor power rating

**Parameter 803 – Parameter lock**

If this parameter is set to "On" you cannot change any parameters. An exception is the parameter "Parameter lock".

This setting makes sense once you have finished starting up the unit and optimizing the parameters. Changing parameters is only possible again when you set this parameter to "Off".

**Parameter 813 – SBus address**

SBus unit address of the inverter power section.

**Parameter 816 – SBus baud rate**

Baud rate of the bus communication to the inverter power section.

**Parameter 830 – Response to external fault**

Programs the fault response that is triggered by an input terminal programmed to "11: External fault" (only in "SBus slave" operating mode).

**Parameter 835 – Response to TF message**

If a temperature sensor is installed in the motor winding, this parameter programs the fault response triggered during temperature monitoring.

**Parameter 836 – Response to SBus timeout**

Programs the fault response that is triggered by SBus timeout monitoring.

**Parameter 840 – Manual reset**

If a fault is present at the power section, you can acknowledge the fault by setting this parameter to "Yes". Once the fault has been reset, the parameter is set automatically to "No" again. If the power section does not indicate a fault, setting the parameter to "Yes" has no effect.

**Parameter 860/861 – PWM frequency 1/2**

Sets the clock frequency at the inverter output. The clock frequency can change automatically depending on the unit utilization.

**Parameter 870 to 872 – Setpoint description PO1 to PO3**

Assignment of the process output data words PO1 to PO3.

**Parameter 873 to 875 – Actual value description PI1 bis PI3**

Assignment of the process input data words PI1 to PI3.

**Parameter 876 – PO data enable**

If the parameter is set to "Yes", the process output data sent by the fieldbus controller becomes effective immediately.

If the parameter is set to "No", the latest valid process output data remain effective.

The PO data is inhibited if the assignment of process data output word PO2 or PO3 is changed. It must be re-enabled in parameter *P876 – PO data enable*.

**Parameter index 15802 – Maximum ramp time**

The parameter is not assigned to a parameter number.

Shows the current value of the ramp time limitation requested by the safety option.

**Parameter index 15803 – Maximum speed CW**

The parameter is not assigned to a parameter number.

Shows the current value of the speed limitation in clockwise rotation requested by the safety option.

**Parameter index 15804 – Maximum speed CCW**

The parameter is not assigned to a parameter number.

Shows the current value of the speed limitation in counterclockwise rotation requested by the safety option.

## 14 Configuration in transparent mode

### 14.1 "Transparent mode" application module

#### INFORMATION



The following information refers to the gateway program of MOVIFIT® function level "Technology" as of version V13.2.

---

The "Transparent mode" application module controls the MOVIFIT® function level "Technology" as a fieldbus gateway. In "Gateway mode", MOVIFIT® function level "Technology" represents a simple fieldbus station providing digital inputs/outputs and transferring process data to the connected power sections in a transparent manner.

To operate a MOVIFIT® function level "Technology" in "Gateway mode", use the Gateway Configurator as the central startup and service tool.

- You can activate the basic functions directly in the Gateway Configurator.
- Advanced functions have to be activated in the MOVIFIT® parameter tree.

The Gateway Configurator and the parameter tree are both part of the MOVITOOLS® MotionStudio engineering software.

#### INFORMATION



You can use application modules ready-made and checked by SEW-EURODRIVE for advanced drive functions such as positioning or simple sequence control systems.

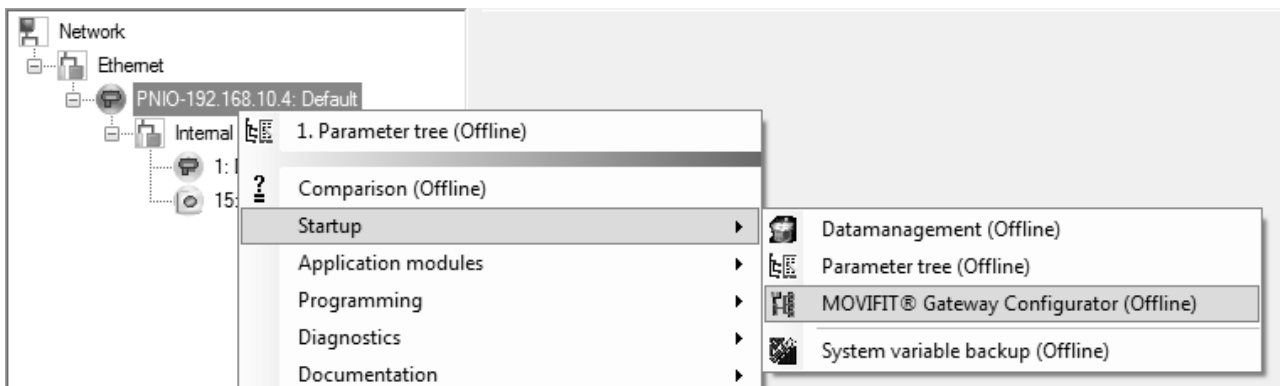
Information on how to operate the application modules is contained in separate manuals. They can be downloaded in PDF format from the SEW-EURODRIVE website → [www.sew-eurodrive.com](http://www.sew-eurodrive.com).

---

## 14.2 Starting the Gateway Configurator

Proceed as follows:

1. Connect the PC/laptop with MOVIFIT® function level "Technology" (depending on the connection type see chapter "Connecting the USB11A interface adapter" (→ 141) or "Connecting the service interface of the MOVIFIT® unit to the PC/laptop" (→ 148)).
2. Perform an online scan (see chapter "Establishing communication and scanning the network" (→ 137)).
3. Select the communication unit.
4. Choose the command [Startup] > [MOVIFIT® Gateway Configurator] from the context menu.



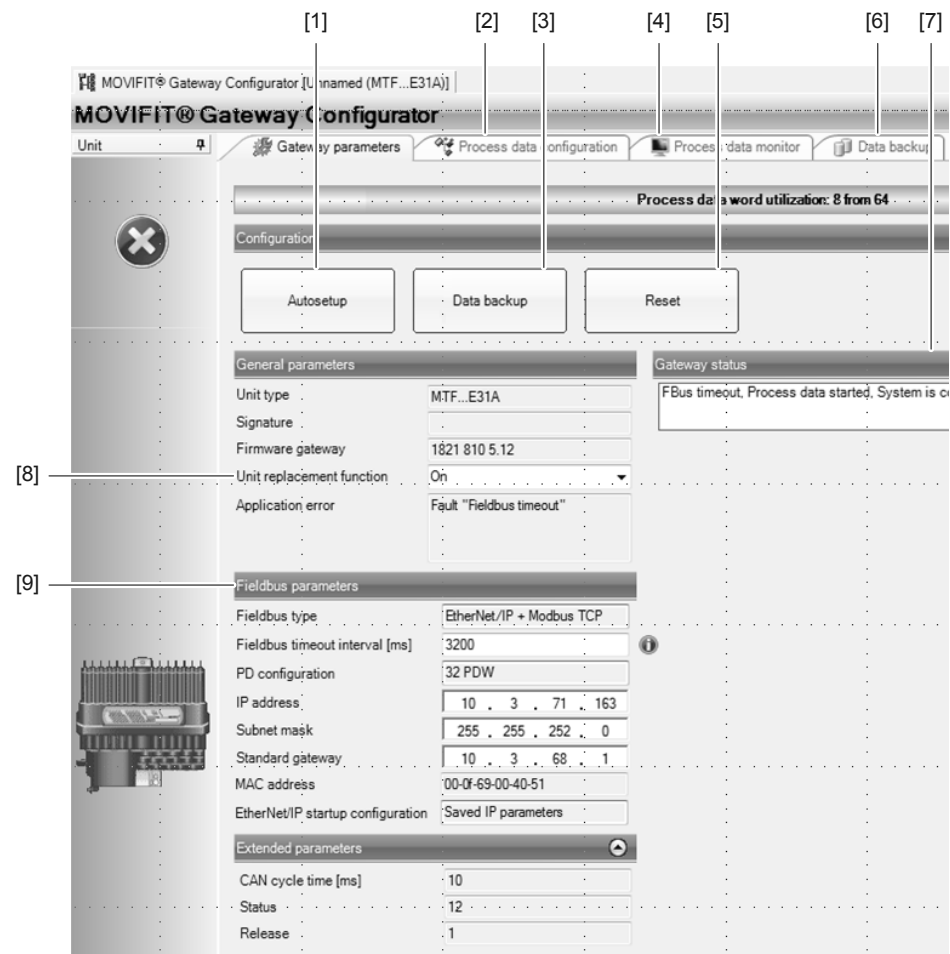
15326973835

⇒ The MOVIFIT® Gateway Configurator is displayed.

14

Configuration in transparent mode

Activating the basic functions



18014399660921739

| No. | Description                                                                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | Click this button to start the auto setup.                                                                                                                                |
| [2] | This tab provides the configuration of the process data of the MOVIFIT® unit and the SBus slaves.                                                                         |
| [3] | Use this button to start the data backup. The data is saved in the ABOX.                                                                                                  |
| [4] | You can read and change the process data in this tab.                                                                                                                     |
| [5] | Use this button to reset the error messages.                                                                                                                              |
| [6] | This tab shows for which units a data backup is available. You can also start a manual download here.                                                                     |
| [7] | You can read off the Gateway status data in this display field.                                                                                                           |
| [8] | Use this choice box to choose if the current data backup is to be loaded into the new unit upon unit replacement. This value is automatically set to "On" after a backup. |
| [9] | You can read and change the fieldbus parameters in these display and input fields.                                                                                        |

### 14.3 Activating the basic functions

Use the Gateway Configurator for activating the basic functions.

21361797/EN – 12/2015

## 14.3.1 Performing an auto setup

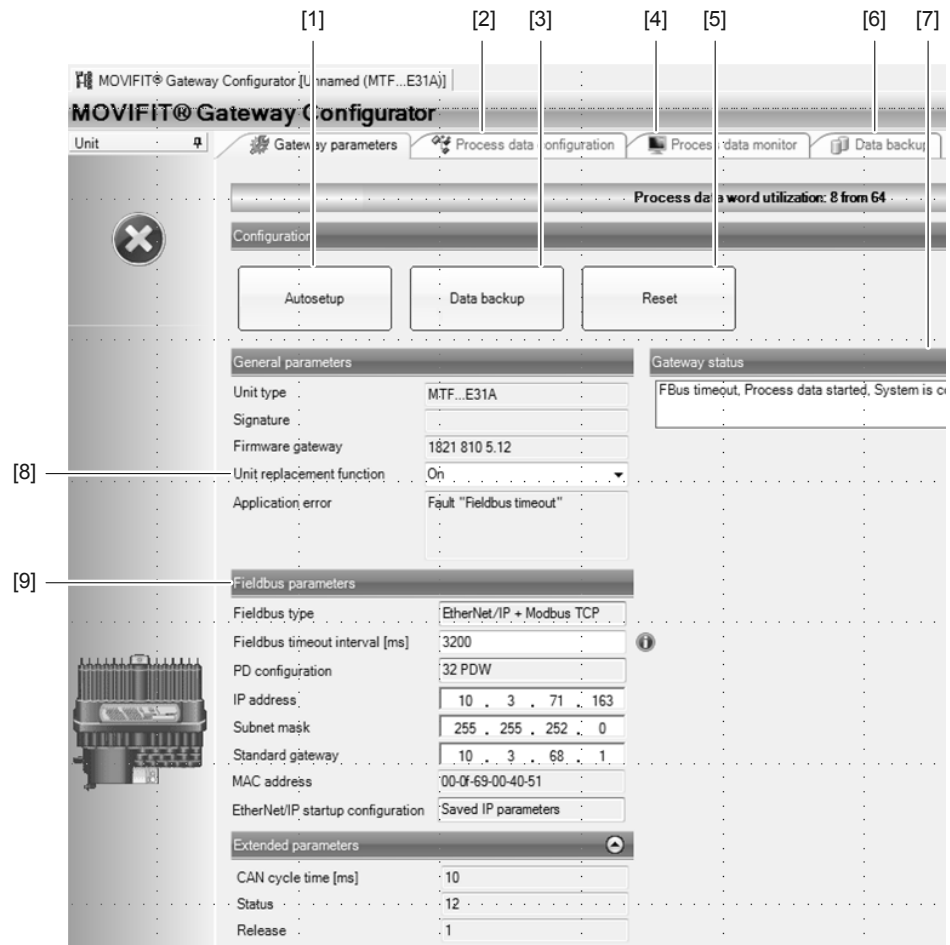
## INFORMATION



If external slaves are connected to the MOVIFIT® unit, addressing of the slaves must begin at address 16.

Proceed as follows:

1. Start the Gateway Configurator (see "Starting the Gateway Configurator" (→ 209)).



18014399660921739

2. Click the button [1].
  - ⇒ The software scans the interfaces and options. The connected units are saved in the internal unit list and a process data block is stored in the process image.
3. Check the fieldbus parameters [9] and compare them to the settings in the fieldbus master. Depending on the fieldbus system used, you can set the fieldbus parameters in these fields or in the fieldbus master.
4. If necessary, reset the "Transparent mode" error messages with the button [5].
5. Click the button [3].
  - ⇒ The unit data intended for the data backup is saved in the ABOX. You can use this data to perform an auto setup in case of a unit failure.
  - ⇒ On completion, the display field [7] displays "Process data started". The MOVIFIT® function level "Technology" is now ready for operation.

### 14.3.2 Displaying the process data exchange

Apart from the process data that is exchanged between the controller and all the configured units, the "Process data monitor" tab in the MOVIFIT® Gateway Configurator also contains the status information on the transparent mode.

#### INFORMATION



The process data monitor only displays the process data of the basic functions. The process image of the advanced functions is available in the MOVIFIT® parameter tree.

#### INFORMATION



You can only force setpoints of the process output data in the process data monitor. Process input data cannot be changed.

#### INFORMATION

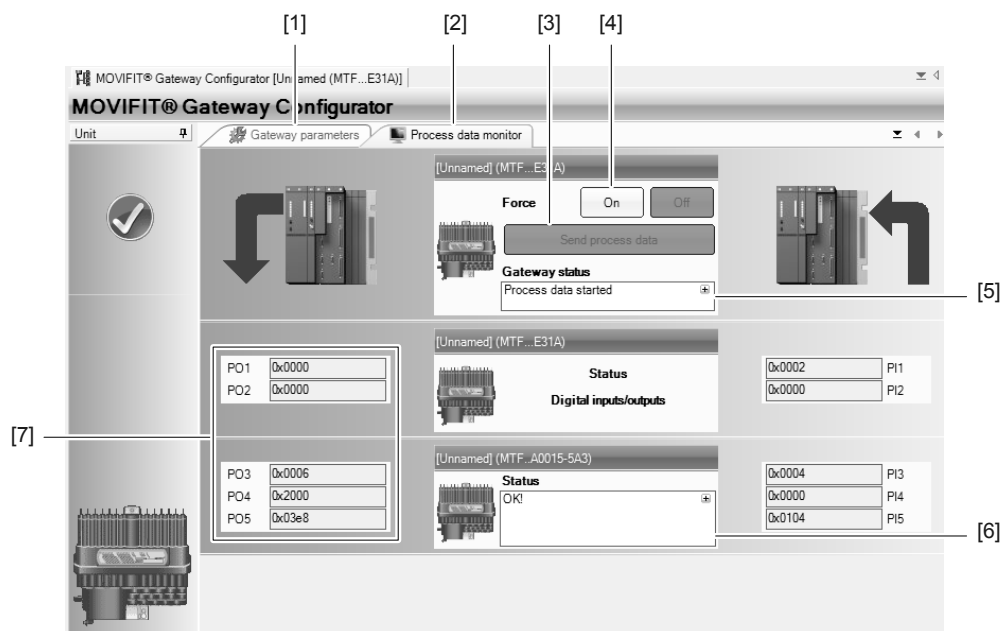


Observe the following discrepancies in visualization for the method of counting of the process data:

- The Gateway Configurator starts the count at PO01/PI01 (process output data word/process input data word).
- The parameter tree in MOVITOOLS® Motion Studio starts the count at PO00/PI00.

Proceed as follows:

1. Start the Gateway Configurator (see chapter "Starting the Gateway Configurator" (→ 209)).
2. Open the tab [2].



9007200557843723

3. Check the process data exchange upon startup. If necessary, apply different number formats to the individual numerical fields in the context menu.



4. To display further status information in the display fields [5] and [6] in text form, click on the symbol [+] in the upper right corner of the respective display field.
5. If you would like to control the MOVIFIT® unit via process data directly from the Gateway Configurator, the data of the higher-level controller are ignored. Proceed as follows to activate the control mode of the Gateway Configurator:
  - To activate "Force mode", click the button [4].
  - Enter the values in the edit boxes [7] that are now active.
  - To send the values to the internal or external power sections, click the button [3].

### 14.3.3 Process image examples

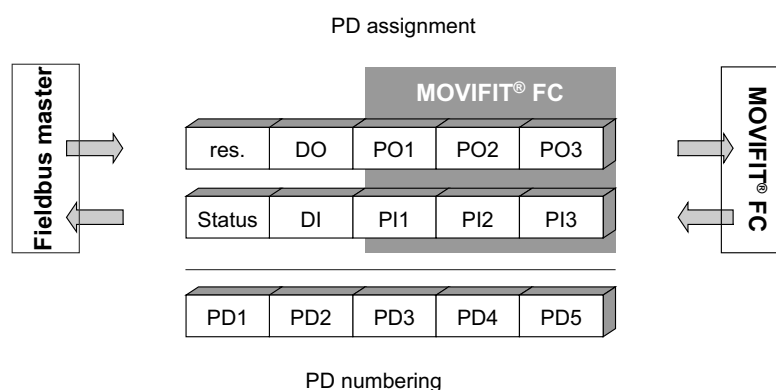
#### INFORMATION



Observe the following discrepancies in visualization for the method of counting of the process data:

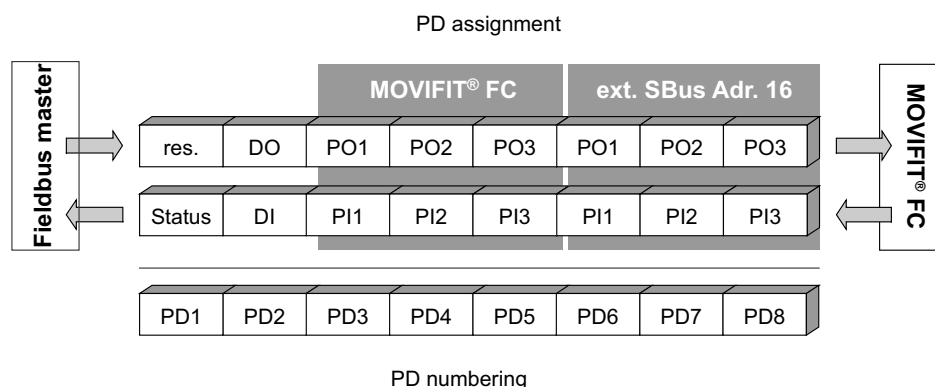
- The Gateway Configurator starts the count at PO01/PI01 (process output data word/process input data word).
- The parameter tree in MOVITOOLS® Motion Studio starts the count at PO00/PI00.

#### MOVIFIT® FC



9007200223971083

#### MOVIFIT® FC with an additional SBus slave



15285978251

The following abbreviations are used in the figures:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

## 14.4 Activating the advanced functions

In order to activate the advanced functions, you have to enable them in the parameter tree of the MOVIFIT® unit first. Use the MOVITOOLS® MotionStudio engineering software for this purpose.

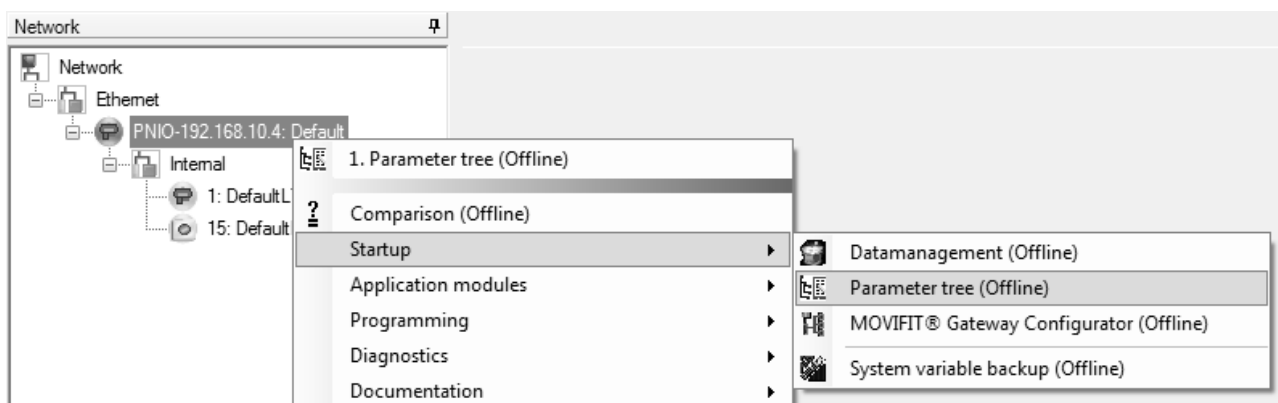
You can activate the following advanced functions:

- "Diagnostics of the S12 safety option" (→ 216)
- "Unit diagnostics with the 12-byte MOVILINK® parameter channel" (→ 221)

### 14.4.1 Opening the parameter tree

Proceed as follows:

1. Connect the PC/laptop with MOVIFIT® function level "Technology" (depending on the connection type see chapter "Connecting the USB11A interface adapter" (→ 141) or "Connecting the service interface of the MOVIFIT® unit to the PC/laptop" (→ 148)).
2. Perform an online scan (see chapter "Establishing communication and scanning the network" (→ 137)).
3. Open the parameter tree (see chapter "Configuring units" (→ 140)).



15326970123

### 14.4.2 Diagnostics of the S12 safety option

By selecting the safety diagnostics, you can read and visualize the current status and the selected safety functions of the S12 safety option via non-safe process data in your higher-level controller.

#### Activating the diagnostics



#### ▲ WARNING

Danger due to incorrect interpretation of the diagnostics data.

Severe or fatal injuries.

- The S12 safety option diagnostics data are not designed for safety and may not be used as safety functions.



#### INFORMATION

A detailed description of the S12 safety option is available in the "MOVIFIT® FC - Functional Safety with S12 Safety Option" manual.

Proceed as follows:

1. Open the parameter tree of the MOVIFIT® control electronics.
2. In the parameter tree, select the node "S12 safety option - Diagnostics".

⇒ The following window is displayed.

15269209867

| No. | Description                                                                                                                                                                                                                                                                                                                                                                            |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | This check box enables/disables the safety diagnostics.<br>If safety diagnostics is enabled, 3 process data with diagnostics data are attached after the process data of the last slave in the process image.                                                                                                                                                                          |
| [2] | This display field shows the data word from which the diagnostics data of the safety function are issued. The count starts at 0.<br>This is a dynamic value and it is influenced by the complete process image of the MOVIFIT® unit. For example, if a MOVIFIT® FC with an internal power section without additional SBus slaves is used, the start word of the diagnostics data is 5. |

# 14 Configuration in transparent mode

Activating the advanced functions

| No. | Description                                                                                                                                                                                                                         |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3] | The status of the safety functions and the digital outputs is displayed in this group.<br>The status of the of the safety function is displayed as 1-active. The actual activation of the safety functions is carried out 0-active. |
| [4] | The status of the S12 safety option and the digital outputs is displayed in this group.                                                                                                                                             |
| [5] | This button opens a PDF file containing a list of all faults of the S12 safety option.                                                                                                                                              |
| [6] | In this group, you are given an overview of the diagnostics data of the S12 safety option.                                                                                                                                          |
| [7] | In case of a fault, this display field provides the fault number.                                                                                                                                                                   |

## Process image examples

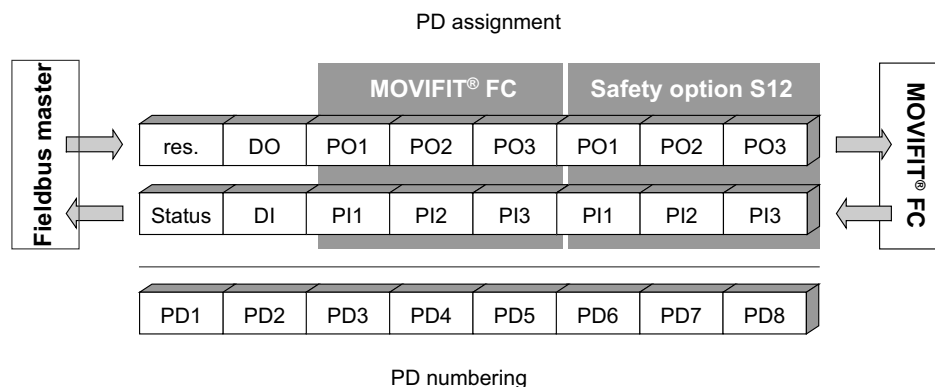


### INFORMATION

Observe the following discrepancies in visualization for the method of counting of the process data:

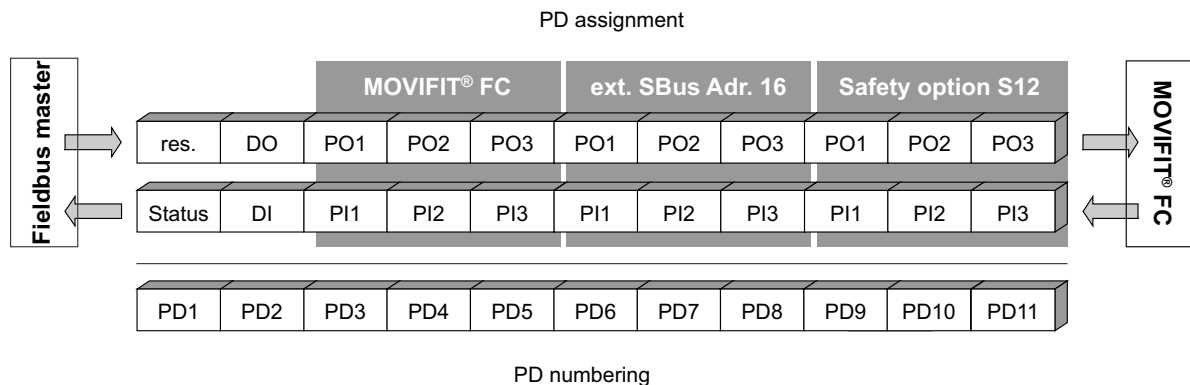
- The Gateway Configurator starts the count at PO01/PI01 (process output data word/process input data word).
- The parameter tree in MOVITOOLS® Motion Studio starts the count at PO00/PI00.

### MOVIFIT® FC



15285989131

### MOVIFIT® FC with an additional SBus slave



15285985803

The following abbreviations are used in the figures:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

### Accessing the S12 safety option with Studio 5000 Logix Designer

#### INFORMATION



In independent operation of the MOVIFIT® unit, only the diagnostics data of the S12 safety option are available.

You can **not** actively control the safety functions with the (not safety-related) controller.

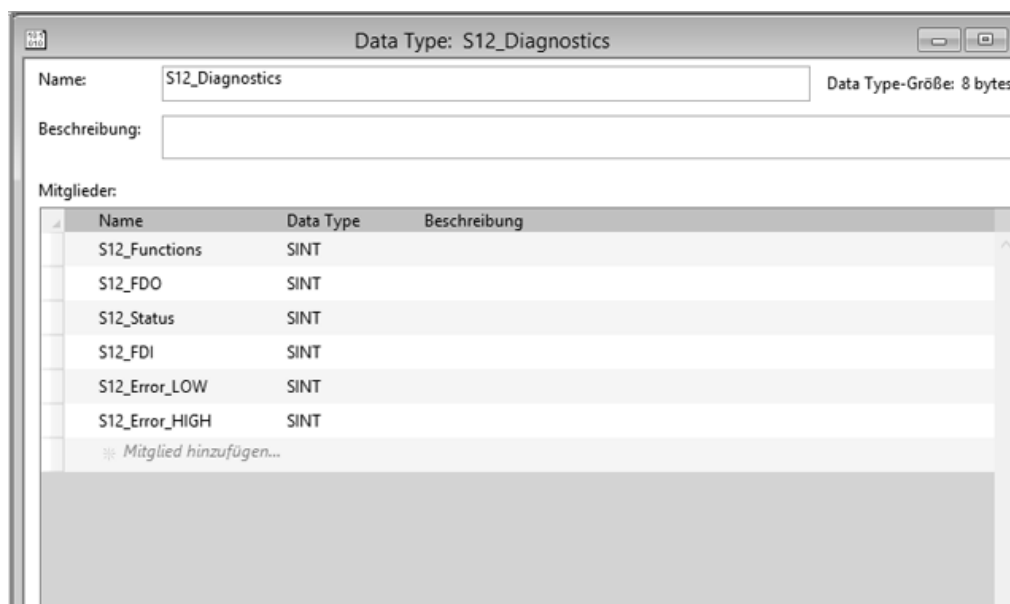
The following example describes configuration of the access to the S12 safety option parameters with the programming software Studio 5000 Logix Designer, version V24 by Rockwell Automation.

Proceed as follows:

# 14 Configuration in transparent mode

Activating the advanced functions

1. Create the user-defined data type "S12\_Diagnostics". It allows you to organize the data elements of the parameter channel in a structure and simplifies access to the data elements.

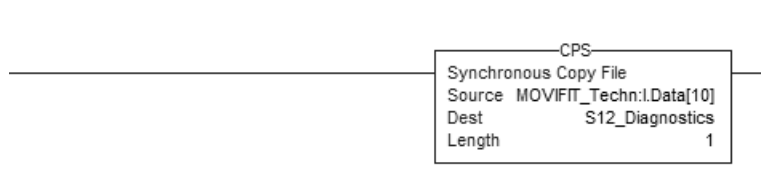


15297365259

2. Create the following controller tags:

| Name           | Data structure |
|----------------|----------------|
| S12_Functions  | SINT           |
| S12_FDO        | SINT           |
| S12_Status     | SINT           |
| S12_FDI        | SINT           |
| S12_Error_LOW  | SINT           |
| S12_Error_HIGH | SINT           |

3. To copy the process data from the unit to the user-defined structure, adapt the program of the controller as follows:



15301597835

4. Save the project and transfer it to the controller.

21361797/EN – 12/2015



5. Switch to RUN mode of the controller.

⇒ The S12 safety option diagnostics data are read.

| Name                             | Usage | Value       | Force | Style  | Data Type       | Description          |
|----------------------------------|-------|-------------|-------|--------|-----------------|----------------------|
| S12_Diagnostics                  | Local | {...}       | {...} |        | S12_Diagnostics |                      |
| + S12_Diagnostics.S12_Functions  |       | 2#0000_0000 |       | Binary | SINT            | S12 Safety Functions |
| + S12_Diagnostics.S12_FDO        |       | 2#0000_0111 |       | Binary | SINT            | S12 Safety Outputs   |
| + S12_Diagnostics.S12_Status     |       | 2#0000_0100 |       | Binary | SINT            | S12 Status           |
| + S12_Diagnostics.S12_FDI        |       | 2#0000_0111 |       | Binary | SINT            | S12 Safety Inputs    |
| + S12_Diagnostics.S12_Error_LOW  |       | 2#0000_0000 |       | Binary | SINT            | S12 Error LOW        |
| + S12_Diagnostics.S12_Error_HIGH |       | 2#0000_0000 |       | Binary | SINT            | S12 Error HIGH       |

15301601163

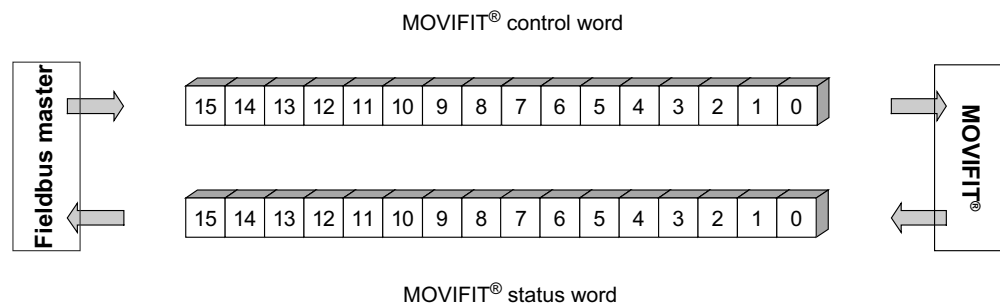
6. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software.

#### 14.4.3 Unit diagnostics with the 12-byte MOVILINK® parameter channel

The 12-byte MOVILINK® parameter channel has to be activated and deactivated via the process output data word (PO0) of the MOVIFIT® control word:

- When bit 3 of the process output data word has the value TRUE, the 12-byte MOVILINK® parameter channel is activated.
- When bit 3 of the process output data word has the value FALSE, the 12-byte MOVILINK® parameter channel is deactivated.

Upon successful activation, the MOVIFIT® status word (PI0) returns "parameter channel active" via bit 3 of the process input data word.



15339252107

### Structure of the 12-byte MOVILINK® parameter channel

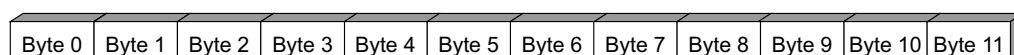


#### INFORMATION

The 12-byte MOVILINK® parameter channel is implemented according to the specification. For detailed information, refer to the "Application Configurator for CCU" manual.

The 12-byte MOVILINK® parameter channel enables access to all parameters, regardless of the bus in use. Special services are available within this parameter channel to being able to read or write various parameter information.

The 12-byte MOVILINK® parameter channel is structured as follows:



15394395531

| Byte | Designation  | Meaning                          |
|------|--------------|----------------------------------|
| 0    | Management   | –                                |
| 1    | Subindex     | –                                |
| 2    | High index   | Parameter index                  |
| 3    | Low index    |                                  |
| 4    | MSB data     | 4 byte data                      |
| 5    | Data         |                                  |
| 6    | Data         |                                  |
| 7    | LSB data     |                                  |
| 8    | Subaddress 1 | Routing information (subrouting) |
| 9    | Subchannel 1 |                                  |
| 10   | Subaddress 2 |                                  |
| 11   | Subchannel 2 |                                  |

The individual bytes have the following functions:

- **Byte 0 (Management byte)**  
Coordinates the complete parameterization procedure. This byte provides important service parameters such as service identifier, data length, version and status of the service performed.
- **Bytes 1 – 3**  
Determine the parameter that is to be read or written via the fieldbus system. Each parameter is assigned a special number (index). You can determine the index easily with MOVITOOLS® MotionStudio (see "Example: Reading the firmware part number with the "Read parameter" service" (→ 228)).
- **Bytes 4 – 7**  
Contain the data of the 12-byte MOVILINK® parameter channel. This means 4 bytes of data can be transmitted per service. The data is always entered with right-justification; that is, byte 7 contains the least significant data byte (LSB data) and byte 4 the most significant data byte (MSB data).
- **Bytes 8 – 11 (routing information)**  
Enable access to the MOVIFIT® unit and subordinate units.

### Management byte

The management byte in the 12-byte MOVILINK® parameter channel (byte 0) is defined as follows:

| Management byte (1 byte) |                        |                                                                                   |
|--------------------------|------------------------|-----------------------------------------------------------------------------------|
| Bit                      | Meaning                | Coding and function                                                               |
| 0<br>(LSB)               | Service identification | 0000 = No service                                                                 |
| 1                        |                        | 0001 = Read parameter                                                             |
| 2                        |                        | 0010 = Write parameter                                                            |
| 3                        |                        | 0011 = Write parameter volatile                                                   |
|                          |                        | 0100 = Read minimum                                                               |
|                          |                        | 0101 = Read maximum                                                               |
|                          |                        | 0110 = Read default                                                               |
|                          |                        | 0111 = Read scale                                                                 |
|                          |                        | 1000 = Read attribute                                                             |
| 4                        | Data length            | 00 = 1 byte                                                                       |
| 5                        |                        | 01 = 2 byte                                                                       |
|                          |                        | 10 = 3 byte                                                                       |
|                          |                        | 11 = 4 byte                                                                       |
| 6                        | Data length            | Must be changed (toggled) on every new task in cyclical transmission.             |
| 7<br>(MSB)               | Status bit             | 0 = No error during execution of service<br>1 = Error during execution of service |

The individual bits have the following functions:

- **Bits 0 – 3**

Contain the service identification. These bits determine which service is to be executed.

- **Bit 4 and bit 5**

Specify the data length in byte. For frequency inverters from SEW-EURODRIVE, this value must be set to 4 bytes.

- **Bit 6 (handshake bit)**

Is used as acknowledgment bit between client and server. As the MOVILINK® parameter channel is transmitted cyclically, the service execution must be triggered by edge control via the handshake bit. For this purpose, the value of this bit is toggled for each new service to be executed. The frequency inverter uses the handshake bit to signal whether the service has been executed or not. The service has been executed if the handshake bit received in the controller is identical with the sent handshake bit.

- **Bit 7 (status bit)**

Indicates whether the service was executed properly or whether errors occurred.

### Supported services

Bits 0 – 3 of the management byte are used to define the individual services.

The following services are supported:

| Service                  | Function                                                                                                                                                                                                                                                                                                                  |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No service               | Indicates that there is no service.                                                                                                                                                                                                                                                                                       |
| Read parameter           | Reads the parameter.                                                                                                                                                                                                                                                                                                      |
| Write parameter          | Writes the parameter. The written parameter value is stored non-volatile (e.g. in EEPROM).<br>This service should not be used for cyclic write accesses because the memory modules allow for only a limited number of write cycles.                                                                                       |
| Write parameter volatile | If the parameter allows it, the parameter is written volatile to the RAM of the frequency inverter by the service. The parameter value is lost when the frequency inverter is switched off. The value written last with the "Write parameter" service is still available when the frequency inverter is switched back on. |

| Service        | Function                                                                                                 |
|----------------|----------------------------------------------------------------------------------------------------------|
| Read minimum   | Determines the smallest parameter value that can be set. The scaling corresponds to the parameter value. |
| Read maximum   | Determines the largest parameter value that can be set. The scaling corresponds to the parameter value.  |
| Read default   | Determines the factory setting of a parameter. The scaling corresponds to the parameter value.           |
| Read scale     | See the following further description of the service.                                                    |
| Read attribute | See the following further description of the service.                                                    |

### "Read scale" service

This service can be used to determine the scaling of a parameter. The frequency inverter provides a quantity index and a conversion index in the management byte.

| Byte | Designation | Meaning          |
|------|-------------|------------------|
| 4    | MSB data    | Reserved         |
| 5    | Data        |                  |
| 6    | Data        | Quantity index   |
| 7    | LSB data    | Conversion index |

The individual bytes have the following functions:

- **Byte 6 (quantity index)**

Is used for coding physical values. This index provides a communication partner with information about which physical quantity is involved with the corresponding parameter value. Coding takes place according to the "sensor/actuator" profile of the German PROFIBUS user organization (PNO). The entry FF<sub>hex</sub> means that no measurement index is specified. You can also gather the measurement index from the parameter list of the frequency inverter.

- **Byte 7 (conversion index)**

Is used for converting the transmitted parameter value into a basic SI unit. Coding takes place according to the "sensor/actuator" profile of the German PROFIBUS user organization (PNO).

The following example explains the "Read scale" service in more detail:

Drive parameter: *P131 ramp t11 down (CW)*

Quantity index: 4 (time with second as measurement unit)

Conversion index: -3 ( $10^{-3}$  = milli)

Numerical value transferred by the fieldbus: 3000<sub>dec</sub>

Numerical value received by the unit:  $3000 \times 10^{-3} \text{ s} = 3 \text{ s}$

### "Read attribute" service

This service can be used for reading the index and the access attributes of the next parameter.

The following table shows how the data in the management byte are coded for this service:

| Byte | Designation | Meaning              |
|------|-------------|----------------------|
| 4    | MSB data    | Next available index |
| 5    | Data        |                      |
| 6    | Data        | Access attributes    |
| 7    | LSB data    |                      |

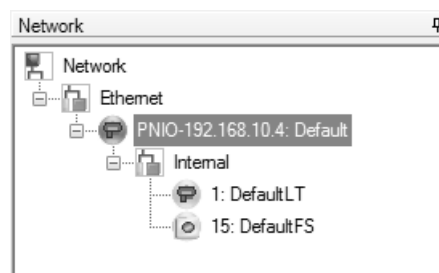
The coding of the access attributes is unit-specific. The following table shows the definition of the access attributes for SEW-EURODRIVE frequency inverters:

| Byte 6 | Byte 7 |                                                                                                                                                                                              |
|--------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bit    | Bit    | Meaning                                                                                                                                                                                      |
| –      | 0      | 1 = Parameter allows write access.                                                                                                                                                           |
|        | 1      | 1 = Parameter is saved non-volatile on EEPROM.                                                                                                                                               |
|        | 2      | 1 = Factory setting overwrites RAM value.                                                                                                                                                    |
|        | 3      | 1 = Factory setting overwrites EEPROM value.                                                                                                                                                 |
|        | 4      | 1 = EEPROM value is valid after initialization.                                                                                                                                              |
|        | 5      | 1 = Controller inhibit condition not necessary for write access.                                                                                                                             |
|        | 6      | 1 = Password is required.                                                                                                                                                                    |
| 8      | 7      | 00 = Parameter is generally valid.<br>01 = Parameter is assigned to parameter set 1.<br>10 = Parameter is assigned to parameter set 2.<br>11 = Parameter is assigned to both parameter sets. |
| 9 – 15 | –      | Reserved                                                                                                                                                                                     |

#### Parameter access to lower-level devices/subsystems (subrouting)

The following figure shows the subsystems "SBus 1" and "Internal" in the MOVITOOLS® MotionStudio engineering software. To access the parameters of the power section of a MOVIFIT® function level "Technology", these subsystems must be routed.

If the values are routed to the MOVIFIT® power section as a lower-level fieldbus or to a unit (subsystem) connected to the MOVIFIT® unit, is defined by the values for Subchannel 1 and Subaddress 1.



15932022155

#### Routing information

For MOVIFIT® function level "Technology" with EtherNet/IP™ interface, the routing information Subaddress 1 and Subchannel 1 are used. The actual parameters are addressed with index and subindex. The routing information Subaddress 2 and Subchannel 2 are not used.

The following table shows the values of byte 8 (Subaddress 1) and byte 9 (Subchannel 1) of the 12-byte MOVILINK® parameter channel. Byte 10 (Subaddress 2) and byte 11 (Subchannel 2) are set to "0".

| Byte 9 (Subchannel 1) |                                 | Byte 8 (Subaddress 1) |
|-----------------------|---------------------------------|-----------------------|
| 0                     | MOVIFIT® control electronics    | 0                     |
| 1                     | SBus 1                          | 16 – 23               |
| 2                     | Internal                        | 1 = Power section     |
|                       |                                 | 15 = Safety option    |
| 3                     | Serial 1 (only for MOVIFIT® MC) | 1                     |
| 4                     | Serial 2 (only for MOVIFIT® MC) | 1                     |
| 5                     | Serial 3 (only for MOVIFIT® MC) | 1                     |

The following example shows which values you have to enter for the routing information in order to rout to the lower-level power section:

| Routing information    | Value |
|------------------------|-------|
| Subaddress 1 (byte 8)  | 1     |
| Subchannel 1 (byte 9)  | 2     |
| Subaddress 2 (byte 10) | 0     |
| Subchannel 2 (byte 11) | 0     |

### Parameter list

For detailed information on coding and access attributes of all parameters, refer to the parameter list in the device documentation.

### Response to the controller

The response of the frequency inverter to the controller to a parameterization request is structured as follows:

- The management byte of the response message is structured like that in the request message.
- The status bit of the management byte indicates whether the service was executed successfully:
  - If the status bit has the value "0", bytes 4 – 7 of the response message will contain the requested data.
  - If the status bit has the value "1", bytes 4 – 7 of the response message will return an error code.

### Return codes for parameterization

In the event of an incorrect parameterization of the 12-byte MOVILINK® parameter channel, the frequency inverter sends back a return code to the parameterized controller. This code provides detailed information about the cause of error. In general, a return code is structured in accordance with EN 50170.

The return code comprises the following elements:

- Error class
- Error code
- Additional code

### Error class

The error class element provides a more exact classification of the error type. The following error classes are distinguished in accordance with EN 50170:

| Class (hex) | Designation           | Meaning                                  |
|-------------|-----------------------|------------------------------------------|
| 1           | vfd state             | Status error of the virtual field device |
| 2           | Application reference | Error in application program             |
| 3           | definition            | Definition error                         |
| 4           | resource              | Resource error                           |
| 5           | service               | Error during execution of service        |
| 6           | access                | Access error                             |
| 7           | ov                    | Error in the object list                 |
| 8           | other                 | Other error (see additional code)        |

The return codes with error class 1 – 7 are generated by the communication software of the fieldbus interface in the event of an error in communication.

The return codes with error class 8 (other error) are delivered directly by the frequency inverter. The error can be identified more precisely using the additional code element. The error code element has the value "0" in this case.

### Error code

The error code element allows for a more detailed identification of the error cause within the error class and is generated by the communications software of the fieldbus interface in the event of faulty communication.

## Additional code

The following table shows the additional codes.

| MOVILINK®   |                 | Designation                      |
|-------------|-----------------|----------------------------------|
| Error class | Additional code |                                  |
| 0x05        | 0x00            | Unknown error                    |
|             | 0x01            | Illegal Service                  |
|             | 0x02            | No Response                      |
|             | 0x03            | Different Address                |
|             | 0x04            | Different Type                   |
|             | 0x05            | Different Index                  |
|             | 0x06            | Different Service                |
|             | 0x07            | Different Channel                |
|             | 0x08            | Different Block                  |
|             | 0x09            | No Scope Data                    |
|             | 0x0A            | Illegal Length                   |
|             | 0x0B            | Illegal Address                  |
|             | 0x0C            | Illegal Pointer                  |
|             | 0x0D            | Not enough memory                |
|             | 0x0E            | System Error                     |
|             | 0x0F            | Communication does not exist     |
|             | 0x10            | Communication not initialized    |
|             | 0x11            | Mouse conflict                   |
|             | 0x12            | Illegal Bus                      |
|             | 0x13            | FCS Error                        |
|             | 0x14            | PB Init                          |
|             | 0x15            | SBus - Illegal Fragment Count    |
|             | 0x16            | SBus - Illegal Fragment Type     |
|             | 0x17            | Access denied                    |
|             | –               | Not used                         |
| 0x08        | 0x00            | No error                         |
|             | 0x10            | Illegal Index                    |
|             | 0x11            | Not yet implemented              |
|             | 0x12            | Read only                        |
|             | 0x13            | Parameter Blocking               |
|             | 0x14            | Setup runs                       |
|             | 0x15            | Value too large                  |
|             | 0x16            | Value too small                  |
|             | 0x17            | Required Hardware does not exist |
|             | 0x18            | Internal Error                   |
|             | 0x19            | Access only via RS485            |
|             | 0x1A            | Access only via RS485            |
|             | 0x1B            | Parameter protected              |
|             | 0x1C            | "Controller inhibit" required    |
|             | 0x1D            | Value invalid                    |
|             | 0x1E            | Setup started                    |
|             | 0x1F            | Buffer overflow                  |
|             | 0x20            | "No enable" required             |
|             | 0x21            | End of File                      |
|             | 0x22            | Communication Order              |
|             | 0x23            | "IPOS Stop" Required             |
|             | 0x24            | Autosetup                        |
|             | 0x25            | Encoder Nameplate Error          |
|             | 0x29            | PLC State Error                  |

### Return code example

The following example shows the return code if an incorrect index was entered when executing a read or write service.

| Element              | Code (hex) | Meaning       |
|----------------------|------------|---------------|
| Error class          | 0x08       | Other         |
| Error code           | 0x00       | –             |
| Additional code high | 0x00       | –             |
| Additional code low  | 0x10       | Illegal Index |

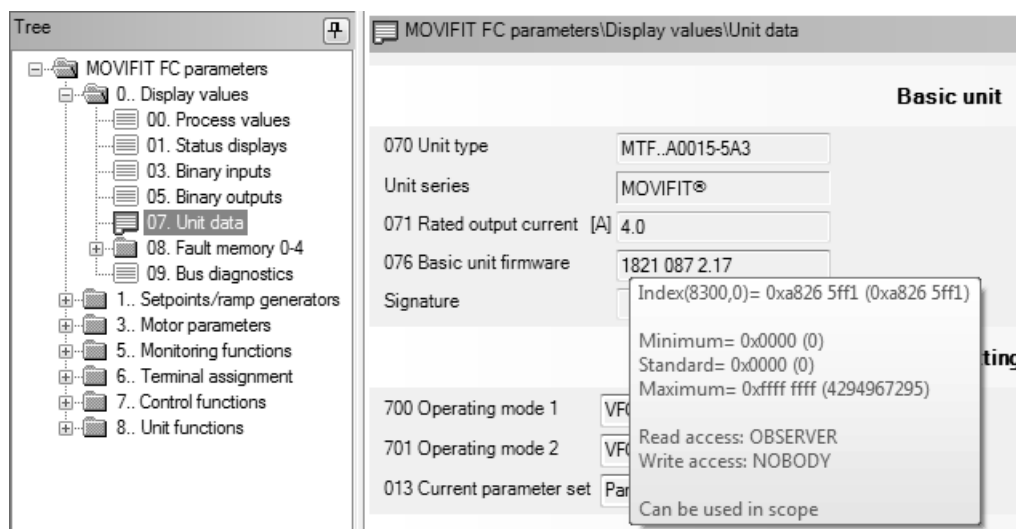
### Example: Reading the firmware part number with the "Read parameter" service

The following example describes the configuration of read access to the MOVIFIT® device parameter firmware part number with the 12-byte MOVILINK® parameter channel. The read access is carried out via the "Read parameter" service from the management byte (byte 0) of the 12-byte MOVILINK® parameter channel.

Before you start reading an index, determine the number of the index in the MOVITOOLS® MotionStudio engineering software.

Proceed as follows:

1. Open the MOVITOOLS® MotionStudio engineering software.
2. Open the parameter tree of the unit.
3. Open parameter group "Display values" > "Unit data".
4. Display the tooltip of the "Firmware" display field.



15934728587

- ⇒ The tooltip displays index, subindex, factor, etc. of the parameter.
  - ⇒ In this example, the index has the value "8300" and the subindex the value "0".
5. Enter the following values in the 12-byte MOVILINK® parameter channel of the higher-level controller:



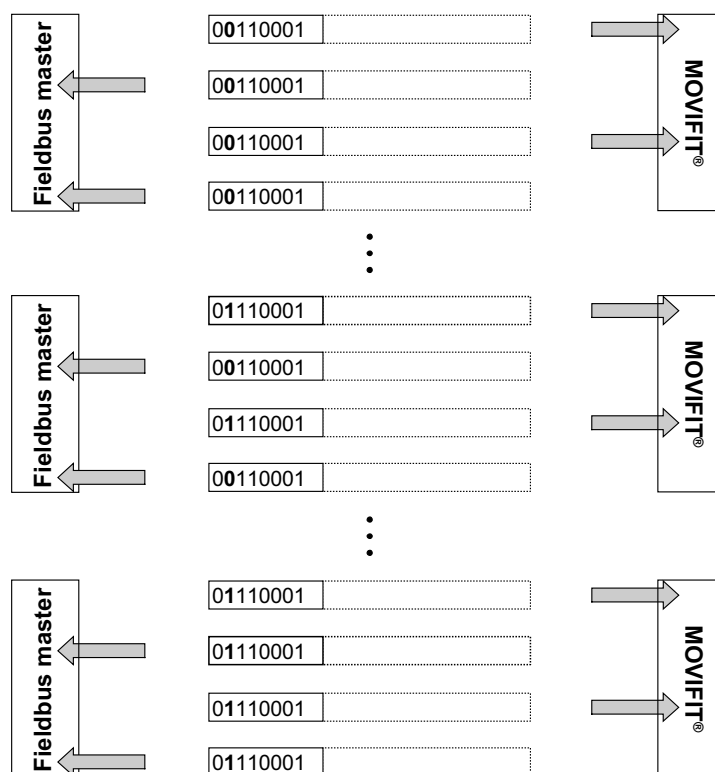
| Byte  | Bit | Value | Meaning                                                                              |
|-------|-----|-------|--------------------------------------------------------------------------------------|
| 0     | 0   | 0     | Service identifier: 0001 = Read parameter                                            |
|       | 1   | 0     |                                                                                      |
|       | 2   | 0     |                                                                                      |
|       | 3   | 1     |                                                                                      |
|       | 4   | 1     | Data length: 11 = 4 byte                                                             |
|       | 5   | 1     |                                                                                      |
|       | 6   | 0/1   | Handshake bit: Must be changed (toggled) on every new task in cyclical transmission. |
|       | 7   | 0     | Status bit: 0 = No error during execution of service                                 |
| 1     | –   | 0     | Subindex                                                                             |
| 2     | –   | 83    | High index                                                                           |
| 3     | –   | 00    | Low index                                                                            |
| 5 – 7 | –   | –     | Data bytes: The response message issues the read out parameter values.               |
| 8     | –   | 1     | Subaddress 1: Power section of the MOVIFIT® unit                                     |
| 9     | –   | 2     | Subchannel 1: "Internal" subsystem                                                   |
| 10    | –   | 0     | Subaddress 2                                                                         |
| 11    | –   | 0     | Subchannel 2                                                                         |

As confirmation of the read service, the unit provides the handshake bit with the same value it was received in the response message.

In the management byte of the response message, the status bit (bit 7) is set to "1" in the event of a faulty service execution. In this case, an error code is signaled in the data bytes (bytes 5 – 7) (see Return codes for parameterization).

#### Parameter setting procedure

The following procedure illustrates the parameterization between higher-level controller and MOVIFIT® unit using the read service as an example. To simplify the sequence, only the management byte (byte 0) of the 12-byte MOVILINK® parameter channel is shown here.



15467349131

The parameterization comprises several steps:

1. While the 12-byte MOVILINK® parameter channel is being prepared for the read service by the fieldbus master (higher-level controller), the unit merely sends and returns the parameter channel.
2. The service is not activated until the moment when the handshake bit (bit 6) is changed. In this example the change from "0" to "1".

The unit now interprets the 12-byte MOVILINK® parameter channel and prepares the read service. At this time, the response message of the unit does not yet contain any valid data. All incoming request messages are still responded to with handshake bit = 0.

3. The data in the response message are not valid until the handshake bit in the response message equals the handshake bit of the request message. If the status bit (bit 7) in the response message is "0", the service has been executed correctly.

By equalizing the handshake bit, the fieldbus master recognizes that the parameter request is completely processed and that a new parameterization can be prepared.

## Activating the unit diagnostics

Proceed as follows:

1. Open the parameter tree of the MOVIFIT® control electronics.
2. In the parameter tree, select the node "12-byte parameter channel diagnostics".

⇒ The following window is displayed.

15269202059

| No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1] | This check box has no function. The 12-byte MOVILINK® parameter channel has to be activated and deactivated via the first process data word (PO0):<br>If the 12-byte MOVILINK® parameter channel is activated, six process data with diagnostics data are attached after the process data of the last slave and the S12 safety option in the process image.                                                                                                                                                                                                                                                                                                                                          |
| [2] | This display field shows the data word from which the diagnostics data of the 12-byte MOVILINK® parameter channel are issued. The count starts at 0.<br>This is a dynamic value and it is influenced by the complete process image of the MOVIFIT® unit: <ul style="list-style-type: none"> <li>• If a MOVIFIT® FC with an internal power section without additional SBus slaves and without diagnostics with the S12 safety option is used, the start word of the diagnostics data is 5.</li> <li>• If a MOVIFIT® FC with an internal power section without additional SBus slaves and with diagnostics with the S12 safety option is used, the start word of the diagnostics data is 8.</li> </ul> |
| [3] | This group displays the request of the controller to the 12-byte MOVILINK® parameter channel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

# 14

## Configuration in transparent mode

Activating the advanced functions

| No. | Description                                                                                                                                                                                                                                                                                                                                                                     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [4] | <p>This group displays the response of the 12-byte MOVILINK® parameter channel to the controller.</p> <ul style="list-style-type: none"><li>• If the MOVILINK® read service has been executed correctly, you can read the response in the "ReadData" display field.</li><li>• If there is a fault, you can read the fault number in the "Fault number" display field.</li></ul> |
| [5] | <p>This button opens a PDF file containing a list of all faults of the 12-byte MOVILINK® parameter channel.</p>                                                                                                                                                                                                                                                                 |
| [6] | <p>This group allows you to directly set the parameter values for executing the MOVILINK® service.</p>                                                                                                                                                                                                                                                                          |
| [7] | <p>You can execute the MOVILINK® service once with this check box. The result is displayed in group [4].</p>                                                                                                                                                                                                                                                                    |

21361797/EN – 12/2015

## Process image examples

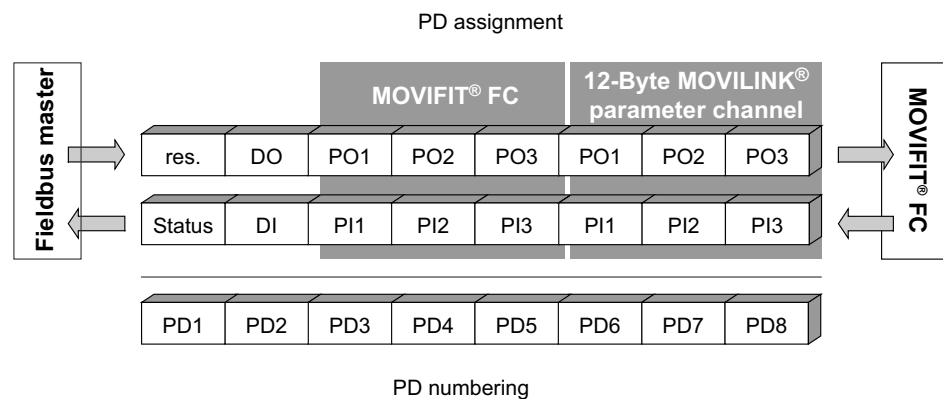
## INFORMATION



Observe the following discrepancies in visualization for the method of counting of the process data:

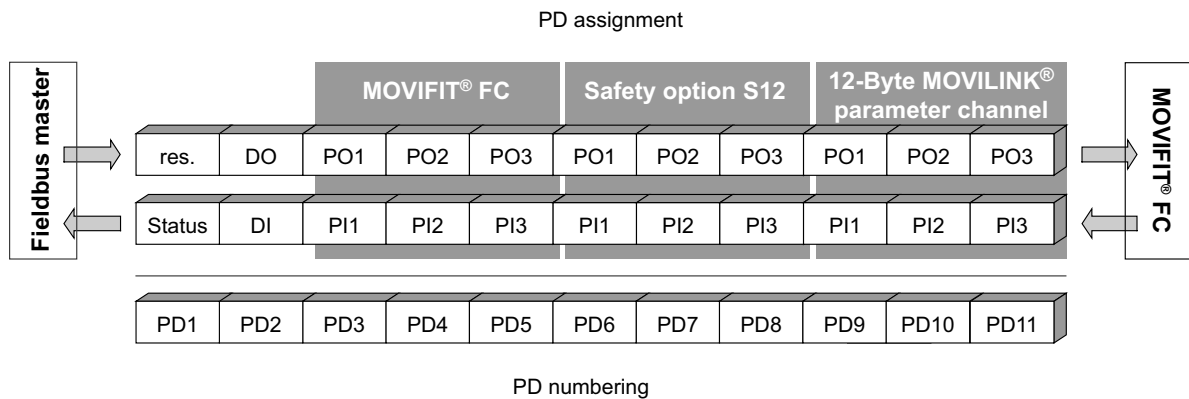
- The Gateway Configurator starts the count at PO01/PI01 (process output data word/process input data word).
- The parameter tree in MOVITOOLS® Motion Studio starts the count at PO00/PI00.

## MOVIFIT® FC



15286842891

## MOVIFIT® FC with safety diagnostics



15286839563

The following abbreviations are used in the following figures:

| Term                     | Abbreviation |
|--------------------------|--------------|
| Digital input            | DI           |
| Digital output           | DO           |
| Process data             | PD           |
| Process input data word  | PI           |
| Process output data word | PO           |

Accessing the 12-byte MOVILINK® parameter channel with Studio 5000 Logix Designer

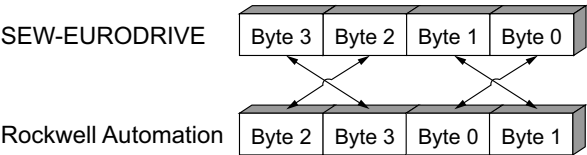
The following example describes configuration of the access to the 12-byte MOVILINK® parameter channel parameters with the programming software Studio 5000 Logix Designer, version V24 by Rockwell Automation.

INFORMATION



SEW-EURODRIVE uses the Little-Endian data format for the 12-byte MOVILINK® parameter channel. Rockwell Automation, however, uses the Middle-Endian data format.

You have to adapt the assignment of the bytes in the 12-byte MOVILINK® parameter channel as follows:



Proceed as follows:

1. Create the user-defined data type "SEW\_Parameterchannel\_12BYTE". It allows you to organize the data elements of the parameter channel in a structure and simplifies access to the data elements.

Name:

SEW\_Parameterchannel\_12BYTE

Data Type-Größe: 12 bytes

Beschreibung:

Mitglieder:

| Name                   | Data Type | Beschreibung |
|------------------------|-----------|--------------|
| SubIndex               | SINT      |              |
| Management             | SINT      |              |
| Index_LOW              | SINT      |              |
| Index_HIGH             | SINT      |              |
| Data_BYTE2             | SINT      |              |
| Data_BYTE3             | SINT      |              |
| Data_BYTE0             | SINT      |              |
| Data_BYTE1             | SINT      |              |
| SubChannel1            | SINT      |              |
| SubAddress1            | SINT      |              |
| SubChannel2            | SINT      |              |
| SubAddress2            | SINT      |              |
| Mitglied hinzufügen... |           |              |

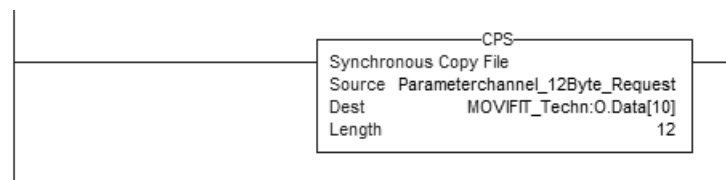
15307634187

2. Create the required controller tags with explicit variable names. The 12-byte MOVILINK® parameter channel is designed in such a way that the controller sends a request to the unit and receives a response from the unit according to the selected service. Both structures are designed identically to allow you to use the same user-defined data type.

| Name                                         | Usage | Value | Force | Style | Data Type                  |
|----------------------------------------------|-------|-------|-------|-------|----------------------------|
| MOVIFIT_Techn                                | Local | {...} | {...} |       | MOVIFIT_Data               |
| Parameterchannel_12Byte_Request              | Local | {...} | {...} |       | SEW_Parameterchannel_12BYT |
| Parameterchannel_12Byte_Request.SubIndex     |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Management   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Index_LOW    |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Index_HIGH   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Data_BYTE2   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Data_BYTE3   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Data_BYTE0   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.Data_BYTE1   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.SubChannel1  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.SubAddress1  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.SubChannel2  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Request.SubAddress2  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response             | Local | {...} | {...} |       | SEW_Parameterchannel_12BYT |
| Parameterchannel_12Byte_Response.SubIndex    |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Management  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Index_LOW   |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Index_HIGH  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Data_BYTE2  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Data_BYTE3  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Data_BYTE0  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.Data_BYTE1  |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.SubChannel1 |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.SubAddress1 |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.SubChannel2 |       | 16#00 |       | Hex   | SINT                       |
| Parameterchannel_12Byte_Response.SubAddress2 |       | 16#00 |       | Hex   | SINT                       |

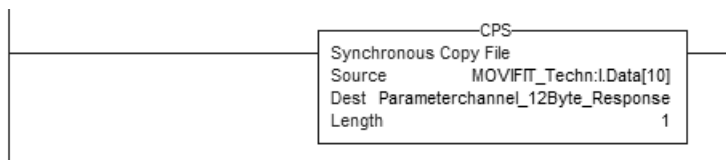
15307650315

3. To copy the parameter request to the process image of the unit, adapt the program of the controller as follows:



15307653643

4. To copy the response from the process image to the user-defined structure, adapt the program of the controller as follows:



15307656971

5. Save the project and transfer it to the controller.

### 6. Switch to RUN mode of the controller.

⇒ The diagnostics data of the 12-byte MOVILINK® parameter channel are read.

| Name                                         | Usage | Value       | Force | Style  | Data Type                   |
|----------------------------------------------|-------|-------------|-------|--------|-----------------------------|
| MOVIFIT_Techn                                | Local | {...}       | {...} |        | MOVIFIT_Data                |
| Parameterchannel_12Byte_Request              | Local | {...}       | {...} |        | SEW_Parameterchannel_12BYTE |
| Parameterchannel_12Byte_Request.SubIndex     |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Management   |       | 2#0100_0001 |       | Binary | SINT                        |
| Parameterchannel_12Byte_Request.Index_LOW    |       | 16#45       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Index_HIGH   |       | 16#21       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Data_BYTE2   |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Data_BYTE3   |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Data_BYTE0   |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.Data_BYTE1   |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.SubChannel1  |       | 16#02       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.SubAddress1  |       | 16#01       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.SubChannel2  |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Request.SubAddress2  |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response             | Local | {...}       | {...} |        | SEW_Parameterchannel_12BYTE |
| Parameterchannel_12Byte_Response.SubIndex    |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Management  |       | 2#0111_0001 |       | Binary | SINT                        |
| Parameterchannel_12Byte_Response.Index_LOW   |       | 16#45       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Index_HIGH  |       | 16#21       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Data_BYTE2  |       | 16#2d       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Data_BYTE3  |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Data_BYTE0  |       | 16#c0       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.Data_BYTE1  |       | 16#c6       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.SubChannel1 |       | 16#02       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.SubAddress1 |       | 16#01       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.SubChannel2 |       | 16#00       |       | Hex    | SINT                        |
| Parameterchannel_12Byte_Response.SubAddress2 |       | 16#00       |       | Hex    | SINT                        |

15307700491

⇒ In this example, the value (3000 min<sup>-1</sup>) of the maximum speed *P302 maximum speed* (Index 8517.0) was read.

### 7. Check if the process data correspond to the values that are displayed in the parameter tree of the MOVITOOLS® MotionStudio engineering software.

## 14.5 Replacing units

### 14.5.1 Replacing the same MOVIFIT® function level "Technology"

A monitoring function is available for MOVIFIT® function level "Technology". After a restart or a slave timeout, this function checks whether the EBOX of the MOVIFIT® FC/SC function level "Technology" or another unit on the external CAN bus has been replaced.

If the EBOX has been replaced, the software transfers the stored data set from the ABOX of the MOVIFIT® function level "Technology" to the new EBOX.

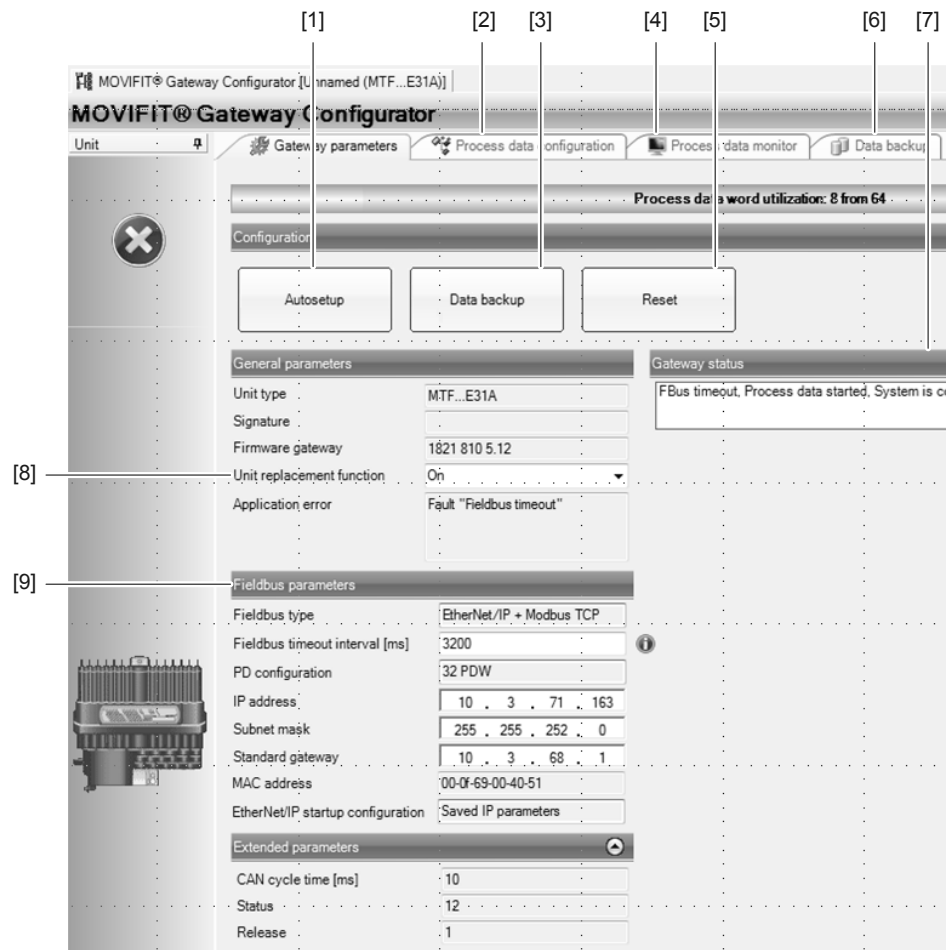
The unit replacement function has to be triggered manually.

Proceed as follows:

- ✓ The new EBOX is of the same type and has the same performance as the replaced EBOX (MOVIFIT® FC/SC).
- ✓ The new EBOX has loaded the same application module as the replaced EBOX. You can read the factory-set application module from the nameplate of the EBOX (see chapter "Available application modules" (→ 18)).
- ✓ The DIP switches S11 for activating DHCP or the standard IP address parameters in the new EBOX are set identically to the replaced EBOX.
- ✓ For MOVIFIT® slave units, the DIP switches S11 must have the same SBus addresses as in the replaced EBOX.



1. Start the Gateway Configurator and perform an auto setup (see chapter "Performing an auto setup" (→ 211)).



18014399660921739

2. Select the setting "On" from the drop-down list [8].
  3. Click the button [3].
- ⇒ On completion, the display field [7] displays the message "System projected".

The following data is saved in the ABOX:

- Data sets of the integrated power section (MOVIFIT® SC and MOVIFIT® FC only)
- Data sets of the slaves with external CAN bus
- Configuration parameters and identification of the "Transparent mode" application module

The following data is **not** saved in the ABOX:

- The "Transparent mode" application module itself. The application module is installed as a standard upon delivery of the MOVIFIT® unit.
- The parameters of the connected MOVIMOT® inverter. MOVIMOT® inverters either do not have parameters or have a separate parameter module.

## INFORMATION



If you mount an EBOX of the wrong type or power rating to the ABOX while the unit replacement function is active, the EBOX will display the fault "F121: Fault during unit replacement" (see chapter "Fault diagnostics" (→ 239)).

### INFORMATION



For further information on the replacement function for other application modules, refer to the respective manual.

#### 14.5.2 Replacing MOVIFIT® function level "Classic" with MOVIFIT® function level "Technology"

##### ▲ WARNING



Risk of crushing due to moving parts.

Severe or fatal injuries.

- Note that stopping the IEC program via [Stop] or a reset via [Reset warm] does not stop the process data. A drive that has been enabled will keep on running.
- Do not enter or access moving parts of the plant.

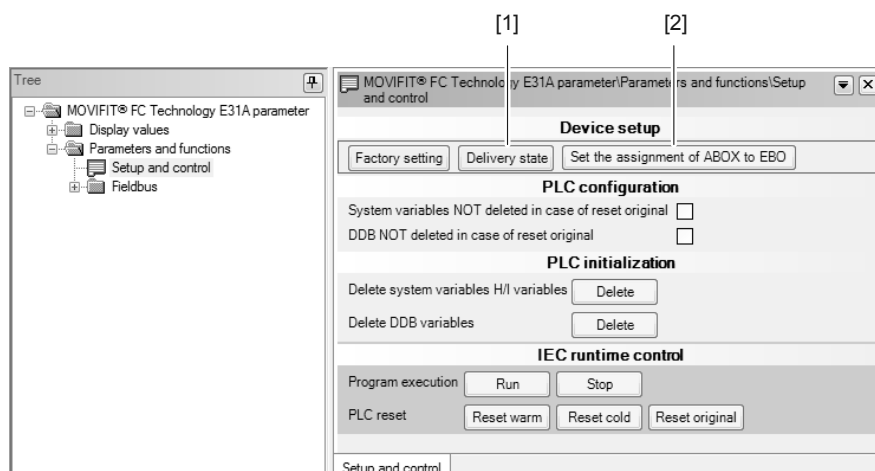
The MOVIFIT® unit performs a plausibility check. The MOVIFIT® unit will generate a fault when replacing a MOVIFIT® function level "Classic" with a MOVIFIT® function level "Technology". The "RUN" LED is lit up red.

As of version V6.1, the MOVITOOLS® MotionStudio engineering software provides the option to change the new assignment and thus rectify the fault.

Proceed as follows:

- ✓ The PLC Editor is logged out.

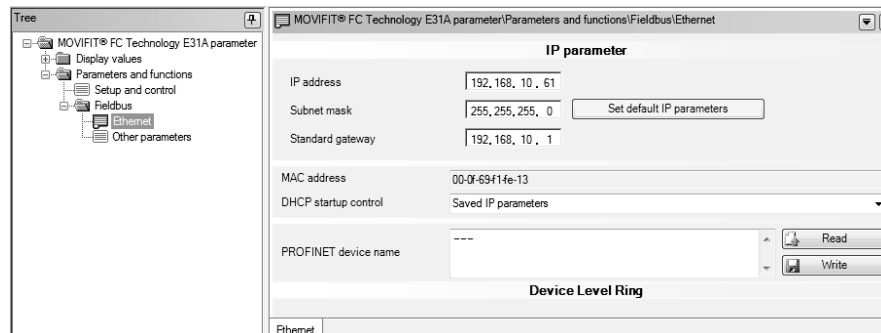
1. Replace the MOVIFIT® function level "Classic" with a MOVIFIT® function level "Technology" of the same type.
2. Connect the PC/laptop with MOVIFIT® function level "Technology" (depending on the connection type see chapter "Connecting the USB11A interface adapter" (→ 141) or "Connecting the service interface of the MOVIFIT® unit to the PC/laptop" (→ 148)).
3. Perform an online scan (see chapter "Establishing communication and scanning the network" (→ 137)).
4. Open the parameter tree of the communication unit.
5. In the parameter tree, select the node "Parameters and functions" > "Setup and control".



9007200889709195

6. Click the button [2].

7. Click the button [1].
8. Wait until the MOVIFIT® function level "Technology" has performed a reboot.
9. In the parameter tree, select the node "Parameters and functions" > "Fieldbus" > "Ethernet".



9007200889889419

10. Set the IP address parameters of the MOVIFIT® unit (see chapter "Setting the IP address parameters" (→ 28)).
11. Switch the 24 V supply of the MOVIFIT® unit off and back on (24 V reset).

## 14.6 Fault diagnostics



### ▲ WARNING

Risk of crushing if the drive keeps running unintentionally after a communication timeout or fault elimination.

Fatal or severe injuries and damage to property.

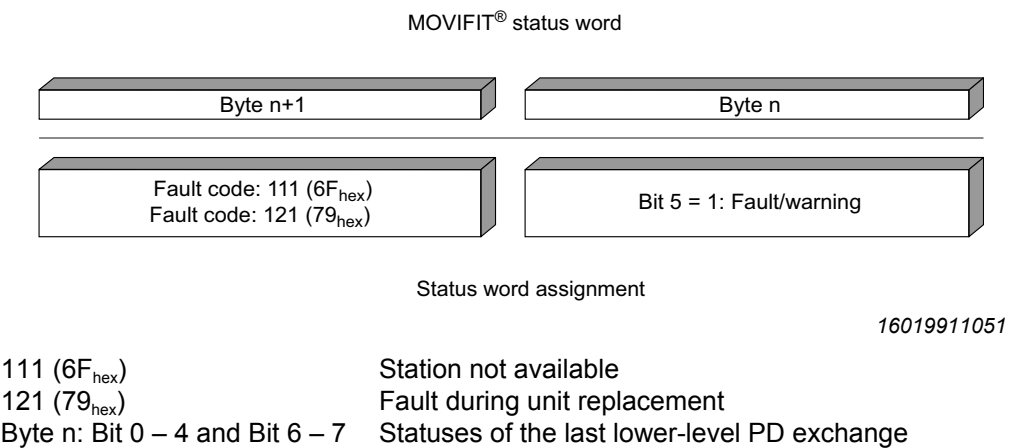
- Note that the communication timeout resets automatically as soon as communication with the lower-level unit is reestablished. Thus, the drives get the current process output data from the control straight away after system bus communication restarts.
- Disconnect the drive controller from the power supply before rectifying a fault if automatic restart of the driven machine after fault elimination is not permitted for safety reasons.

If the internal or external system bus communication to lower-level units is faulty (communication timeout), the system fault "F11: Station not available" is triggered. However, the units and digital inputs/outputs still receiving their process data can still be controlled.

- The fault code "F111: "Station not available" is displayed in the process input data word PI1 of the interrupted drive in status word 1.
- With MOVIFIT® SC, the fault code is displayed in both status words of the process input data words PI1 and PI2. In the application program, a function block monitors the status and the fault states of the lower-level units. This function block also detects system faults.

- If the RS485 communication of MOVIFIT® MC with the MOVIMOT® inverter is faulty and they receive no data, the units automatically stop after 1 s. The units do not resume operation until they receive valid process data again. With MOVIMOT® MM..D the timeout interval is parameterizable.
- A MOVIFIT® FC or SC drive stops within 100 ms in case of a communication timeout. Do not change the factory setting of 100 ms to make sure the safety of the system is not jeopardized.

The following figure shows the displayed fault number in the status word of the MOVIFIT® unit:



The following table shows the displayed fault numbers in the status word of the respective unit:

| Unit        | Process input data word (PI)                   | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MOVIMOT®    | PI1: Status word 1                             | If there is a fault (bit 5 = 1), the fault code 111 (6F <sub>hex</sub> ) is displayed for the system fault "Station not available".<br><br>All other status information remains unchanged.                                                                                                                                                                                                                                                                |
| MOVIFIT® FC | PI1: Status word 1                             | <ul style="list-style-type: none"><li>• If there is a fault (bit 5 = 1), the fault code 111 (6F<sub>hex</sub>) is displayed for the system fault "Station not available".<br/><br/>All other status information remains unchanged.</li><li>• If there is a fault (bit 5 = 1), the fault code 121 (79<sub>hex</sub>) is displayed for the system fault "Fault during unit replacement".<br/><br/>All other status information remains unchanged.</li></ul> |
| MOVIFIT® SC | PI1: Status word SC/<br>status word SC motor 1 |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## 15 Parameterization and manual mode with the DBG keypad

### 15.1 DBG keypad – description:

#### 15.1.1 Function

You can use the DBG keypad for parameterization and manual operation of the MOVIFIT® unit. In addition to that, the keypad displays important information about the state of the MOVIFIT® unit.

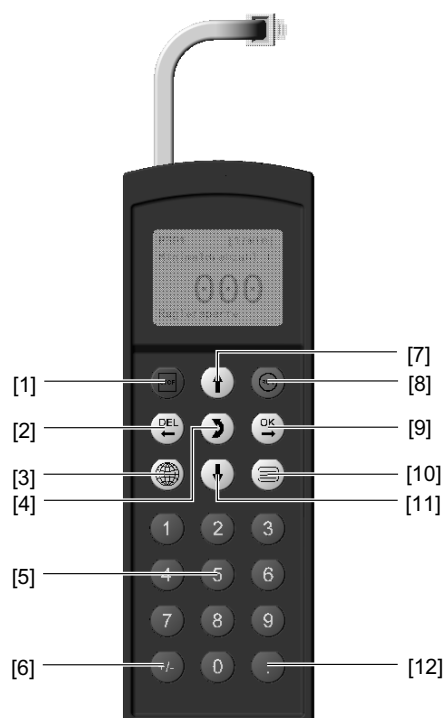
#### 15.1.2 Characteristics

- Illuminated plain text display
- Choice of 7 languages
- Keypad with 21 keys
- Can be connected via extension cable DKG60B (5 m length)
- Corresponds to degree of protection IP 40 (EN 60529)

#### 15.1.3 Keypad variants

| Keypad    | Language                                                                                                 | Part number |
|-----------|----------------------------------------------------------------------------------------------------------|-------------|
| DBG60B-01 | DE / EN / FR / IT / ES / PT / NL<br>(German / English / French / Italian / Spanish / Portuguese / Dutch) | 1 820 403 1 |
| DBG60B-02 | DE / EN / FR / FI / SV / DA / TR<br>(German / English / French / Finnish / Swedish / Danish / Turkish)   | 1 820 405 8 |
| DBG60B-03 | DE / EN / FR / RU / PL / CS<br>(German / English / French / Russian / Polish / Czech)                    | 1 820 406 6 |

## 15.1.4 DBG – key assignment



792878475

|      |     |       |                                              |
|------|-----|-------|----------------------------------------------|
| [1]  | Key |       | Stop                                         |
| [2]  | Key |       | Delete previous entry                        |
| [3]  | Key |       | Select language                              |
| [4]  | Key |       | Change menu                                  |
| [5]  | Key | 0 – 9 | Digits 0 – 9                                 |
| [6]  | Key |       | Sign reversal                                |
| [7]  | Key |       | Up arrow, moves up to the next menu item     |
| [8]  | Key |       | Start                                        |
| [9]  | Key |       | OK, confirms the entry                       |
| [10] | Key |       | Activate the context menu                    |
| [11] | Key |       | Down arrow, moves down to the next menu item |
| [12] | Key |       | Decimal point                                |

## 15.1.5 Connecting the DBG keypad

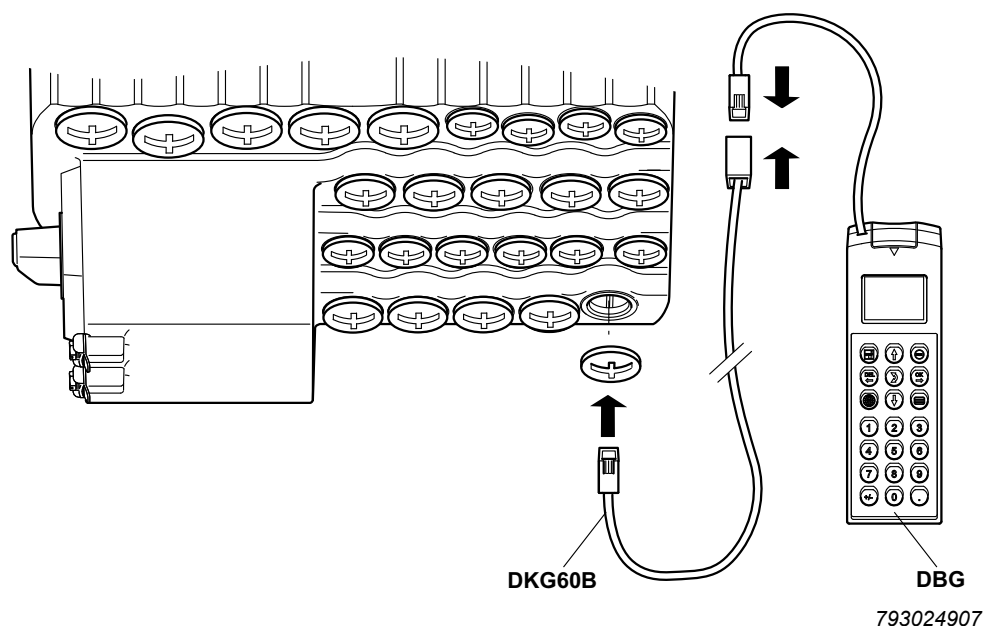
**▲ WARNING**

Risk of burns due to hot surfaces of the MOVIFIT® unit or external options (e.g. braking resistor).

Severe injuries.

- Do not touch the MOVIFIT® unit and the external options until they have cooled down sufficiently.

The MOVIFIT® unit has an X50 diagnostic interface (RJ10 plug connector) for parameterization and manual operation. The diagnostic interface X50 of the MOVIFIT® unit is located at the ABOX under a screw plug.



Proceed as follows:

1. Remove the screw plug from the X50 diagnostic interface.
2. Plug the RJ10 connector on the connector cable into the diagnostics socket of the MOVIFIT® unit.
3. You can also connect the DBG keypad to the MOVIFIT® unit using option DKG60B (5 m extension cable included in the delivery).

| Option | Description                                                                                                       | Part number |
|--------|-------------------------------------------------------------------------------------------------------------------|-------------|
| DKG60B | <ul style="list-style-type: none"> <li>• 5 m extension cable</li> <li>• 4-core, shielded cable (AWG26)</li> </ul> | 0 817 583 7 |

**NOTICE**

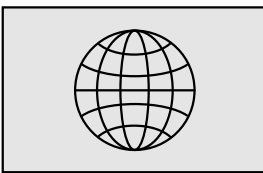
Loss of the ensured degree of protection if the screw plug of the X50 diagnostic interface is not installed or not installed correctly.

Damage to the MOVIFIT® unit.

- Make sure the screw plug of the diagnostic interface has a seal and screw it in after parameterization, diagnostics or manual operation.

## 15.2 Operating the MOVIFIT® unit with the DBG keypad

### 15.2.1 Selecting a language

| Step | Procedure                                                                                                                                                                                                                                                                                                                                                                         | Figure                                                                              |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1    | The SEW-EURODRIVE logo appears on the display for a few sections when the DBG keypad is switched on for the first time or after activating the delivery status.                                                                                                                                                                                                                   |  |
|      | The symbol for language selection then appears on the display.                                                                                                                                                                                                                                                                                                                    |  |
| 2    | <p>Press the  key until the desired language appears.</p> <p>Press the  key to confirm your selection.</p> <p>The DBG keypad searches for the connected units and displays them in the unit selection list.</p> |  |

### 15.2.2 DBG context menu

Press the  key to go to the context menu.

For the power section of the MOVIFIT® unit, the following menu items are available in the context menu of the DBG keypad:

- [BASIC VIEW]
- [PARAMETER MODE]
- [MANUAL MODE]
- [COPY TO DBG]
- [COPY TO FIT]
- [DGB DELIVERY]
- [UNIT SETTINGS]
- [SIGNATURE]
- [EXIT]



## 15.2.3 Activating manual operation

**▲ WARNING**

Risk of crushing if the drive connected to the MOVIFIT® unit starts up unintentionally when manual operation is deactivated. The process data of the master take effect upon deactivation. The enable signal may be present via the process data.

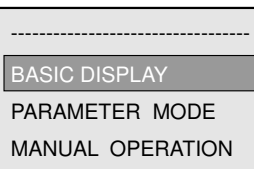
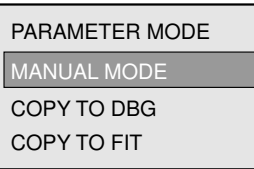
Severe or fatal injuries.

- Before deactivating manual operation, set the process data in such way that the drive connected to the MOVIFIT® unit is not enabled.
- Change the process data only after deactivating manual operation.

**INFORMATION**

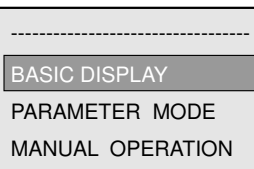
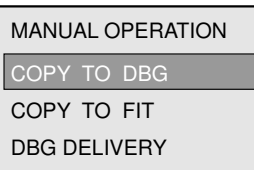
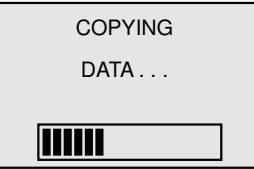
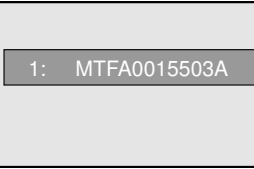
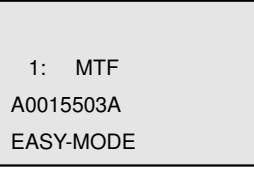
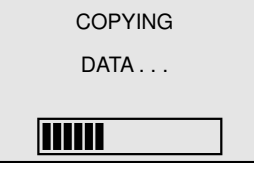
If the drive is enabled or the brake is released, you cannot change to manual operation.

The message "NOTE 17: INV. ENABLED" appears on the display for 2 s and the DBG keypad returns to the context menu.

| Step | Procedure                                                                                                                                                            | Figure                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Use the  key to activate the context menu.                                          |   |
| 2    | Use the  key to select the [MANUAL MODE] command.                                 |  |
| 3    | Use the  key to start manual mode.<br>The keypad is now in manual operation mode. |                                                                                       |

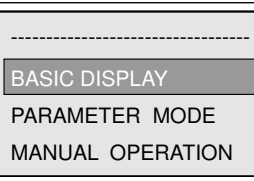
## 15.2.4 Copying the parameter set

You can copy complete parameter sets of the integrated power section of a MOVIFIT® FC/SC unit to another MOVIFIT® unit of the same unit type using the DBG keypad.

| Step | Procedure                                                                                                                                                                                  | Figure                                                                                |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Use the  key to activate the context menu.                                                                |    |
| 2    | Use the  key to select the [COPY TO DGB] command.                                                         |    |
| 3    | Press the  key to confirm your selection.<br>The data is copied from the MOVIFIT® unit to the DBG keypad. |    |
| 4    | After the copying process, connect the DBG keypad to another MOVIFIT® unit. The MOVIFIT® unit must be of the same unit type with the same DIP switch setting.                              |                                                                                       |
| 5    | Use the  key to select the [COPY TO FIT] command.                                                       |  |
| 6    | Press the  key to confirm your selection.<br>The type designation of the MOVIFIT® unit is displayed.    |  |
| 7    | Press the  key.<br>An overview of the MOVIFIT® type is displayed.                                       |  |
| 8    | Press the  key.<br>The data is copied from the DBG keypad to the MOVIFIT® unit.                         |  |

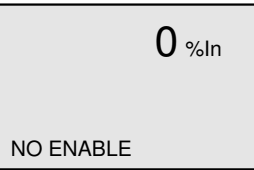
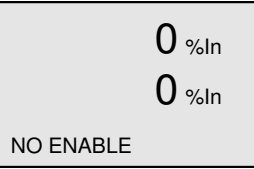
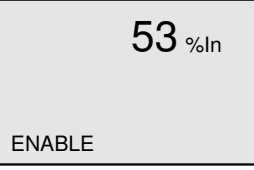
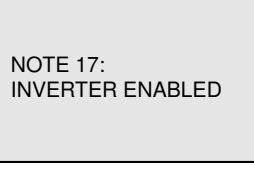
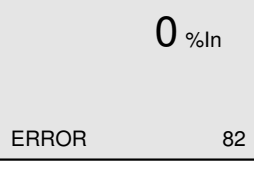
### 15.3 Operating MOVIFIT® SC with the DBG keypad

#### 15.3.1 Selecting MOVIFIT® SC power section

| Step | Procedure                                                                                                                                                                                                                                                                                                                                         | Figure                                                                              |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1    | Select the required language (see chapter "Selecting a language" (→ 244)).                                                                                                                                                                                                                                                                        |                                                                                     |
| 2    | Use the  or the  key to select the MOVIFIT® SC power section (SBus address 1).<br>The DBG keypad searches for the connected units and displays them in the unit selection list. |                                                                                     |
| 3    | Press the  key to confirm your selection.<br>The [BASIC DISPLAY] menu opens.                                                                                                                                                                                     |  |

#### 15.3.2 Basic display

The [BASIC DISPLAY] menu represents important characteristic values.

| Basic display                                                    | Figure                                                                                |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Display if starter is not enabled in single-motor operating mode |  |
| Display if starter is not enabled in dual-motor operating mode   |  |
| Display for enabled starter                                      |  |
| Information message                                              |  |
| Fault display                                                    |  |

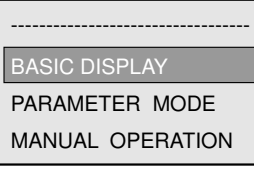
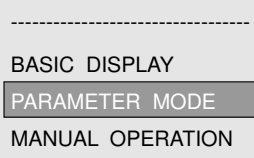
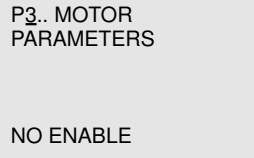
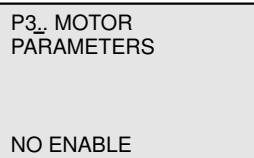
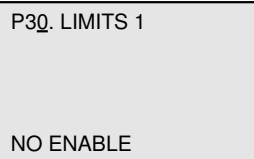
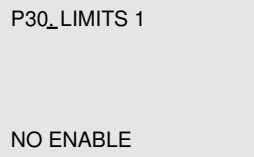
## 15.3.3 Setting parameter mode

In the [PARAMETER MODE] menu, you can check and change parameter settings.

## INFORMATION



Parameters can only be set in "Expert mode".

| Step | Procedure                                                                                                                                                                                                                                                                                                                  | Figure                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Use the  key to activate the context menu.                                                                                                                                                                                                |    |
| 2    | Use the  key to select the [PARAMETER MODE] command.                                                                                                                                                                                      |    |
| 3    | Use the  key to start parameter mode.<br>The first display parameter P000 "OUTPUT CURRENT 1" is displayed.                                                                                                                                |                                                                                       |
| 4    | Use the  or the  key to select the main parameter groups 0 – 9.                                                                                      |  |
| 5    | Press the  key to activate the selection of the parameter subgroup in the required main parameter group.<br>The flashing cursor moves one position to the right.                                                                        |  |
| 6    | Use the  or the  key to select the required parameter subgroup.<br>The flashing cursor is positioned under the second digit of the parameter number. |  |
| 7    | Press the  key to activate the parameter selection in the required parameter subgroup.<br>The flashing cursor moves one position to the right.                                                                                          |  |
| 8    | Use the  or the  key to select the required parameter.<br>The flashing cursor is positioned under the third digit of the parameter number.           |  |

| Step | Procedure                                                                                                                                                                                                                                                                                                                                                                       | Figure                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 9    | Use the  key to activate the setting mode for the selected parameter.<br>The cursor is positioned under the parameter value.                                                                                                                                                                   | P300 %<br>SWITCH-OFF CURR. 1<br>150_<br>NO ENABLE            |
| 10   | Use the  or the  key to set the required parameter value.                                                                                                                                                     | P300 %<br>SWITCH-OFF CURR 1<br>135_<br>NO ENABLE             |
| 11   | Use the  key to confirm the settings and use the  key to exit the setting mode.<br>The flashing cursor is positioned under the third digit of the parameter number again.                                     | P300 %<br>SWITCH-OFF CURR 1<br>135<br>NO ENABLE              |
| 12   | Use the  or the  key to select another parameter or use the  key to go back to the parameter subgroup menu.                  | P30. LIMITS 1<br>NO ENABLE                                   |
| 13   | Use the  or the  key to select another parameter subgroup or use the  key to go back to the main parameter group menu. | P3. MOTOR<br>PARAMETERS<br>NO ENABLE                         |
| 14   | Use the  key to go back to the context menu.                                                                                                                                                                                                                                                 | -----<br>BASIC DISPLAY<br>PARAMETER MODE<br>MANUAL OPERATION |

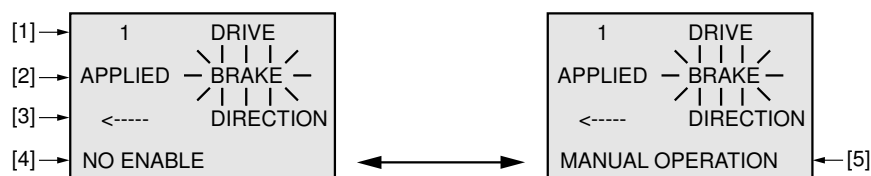
### 15.3.4 Manual operation

Proceed as follows:

- Switch to manual operation (see chapter "Activating manual operation" (→ 245)).

#### Functions in single-motor operating mode

The following displays are toggled about every 2 s during manual operation:



793011595

- [1] Drive  
[2] Brake status  
[3] Direction of rotation<sup>1)</sup>  
1) "<----" = CCW, "---->" = CW

- [4] Drive status  
[5] Display of manual operation

In single-motor operation, you can execute the following functions via the [MANUAL OPERATION] menu:

- Setting the direction of rotation
- Starting the drive
- Stopping the drive
- Releasing the brake without drive enable

#### Setting the direction of rotation

Proceed as follows:

1. Use the key to select the [DIRECTION] command.  
⇒ The [DIRECTION] command is flashing.
2. Press the key to confirm your selection.  
⇒ The [DIRECTION] command is inversely displayed.
3. Use the or the key to select the required direction of rotation.

#### Starting the drive

Proceed as follows:

- Use the key to start the drive.

During operation, the keypad displays the current motor current as a relative value in percentage. The motor current refers to the nominal motor current  $I_N$ .

#### Stopping the drive

Proceed as follows:

- Use the key to stop the drive.

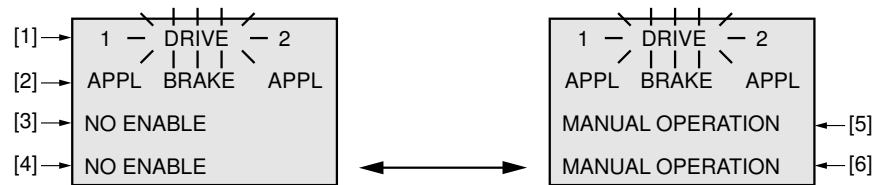
## Releasing the brake without drive enable

Proceed as follows:

1. Use the  key to select the [BRAKE] command.  
⇒ The [BRAKE] command is flashing.
2. Use the  or the  key to release or apply the brake without enabling the drive.
3. Press the  key to confirm your selection.

## Functions in dual-motor operating mode

The following displays are toggled about every 2 s during manual operation:



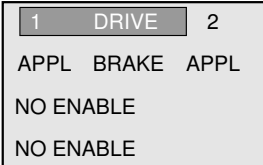
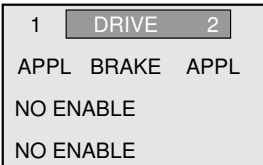
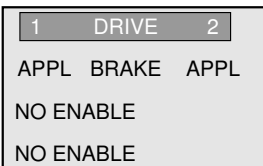
793013259

- |                    |                                      |
|--------------------|--------------------------------------|
| [1] Drive          | [4] Status drive 2                   |
| [2] Status brakes  | [5] Display manual operation drive 1 |
| [3] Status drive 1 | [6] Display manual operation drive 2 |

In dual-motor operation, you can execute the following functions via the [MANUAL OPERATION] menu:

- Selecting the drive
- Starting the drive
- Stopping the drive
- Releasing the brake without drive enable
- Deactivating manual operation

*Selecting the drive*

| Step | Procedure                                                                                                                                                                                                                    | Figure                                                                               |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1    | Use the  key to select the [DRIVE] command.<br>The [DRIVE] command is flashing.                                                             |                                                                                      |
| 2    | Press the  key to confirm your selection.                                                                                                   |                                                                                      |
| 3    | Use the  or the  key to select the drive to be controlled: |                                                                                      |
|      | • Drive 1                                                                                                                                                                                                                    |   |
|      | • Drive 2                                                                                                                                                                                                                    |   |
|      | • Both drives                                                                                                                                                                                                                |  |

*Starting the drive*

Proceed as follows:

- Use the  key to start the drive/s.

*Stopping the drive*

Proceed as follows:

- Use the  key to stop the drive/s.



*Releasing the brake without drive enable***INFORMATION**

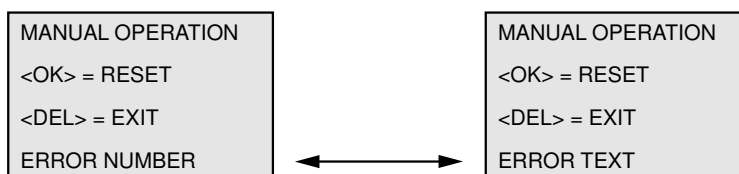
If the MOVIFIT® unit controls both drives in manual operation, the MOVIFIT® unit releases or applies the brakes of both drives.

Proceed as follows:

1. Use the  key to select the [BRAKE] command.  
⇒ The [BRAKE] command is flashing.
2. Use the  or the  key to release or apply the brake without enabling the drive.
3. Press the  key to confirm your selection.

*Resetting faults*

If a fault occurs during manual operation, the display shows the following message. The display toggles about every 2 s.



793021579

| Step | Procedure                                                                                                                                                               | Figure                              |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 1    | Press the  key to reset the fault.<br>A message is displayed during the fault reset. | MANUAL OPERATION<br>PLEASE WAIT ... |
|      | After the fault reset, manual operation remains active. The manual operation display is displayed again.                                                                |                                     |

Deactivating manual operation



**▲ WARNING**

Risk of crushing if the drive connected to the MOVIFIT® unit starts up unintentionally when manual operation is deactivated. The process data of the master take effect upon deactivation. The enable signal may be present via the process data.

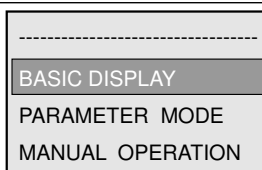
Severe or fatal injuries.

- Before deactivating manual operation, set the process data in such way that the drive connected to the MOVIFIT® unit is not enabled.
- Change the process data only after deactivating manual operation.

| Step | Procedure                                                                                                                                                                                                                                       | Figure                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| 1    | Use the  or the  key to deactivate manual operation.<br>A query is displayed. | <div>ACTIVATE<br/>AUTOMATIC MODE ?<br/><br/>DEL=NO      OK=YES</div>       |
| 2    | Press the  key.<br>The context menu opens.                                                                                                                     | <div>-----<br/>BASIC DISPLAY<br/>PARAMETER MODE<br/>MANUAL OPERATION</div> |

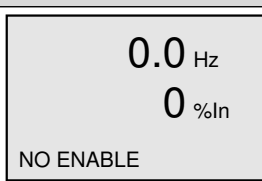
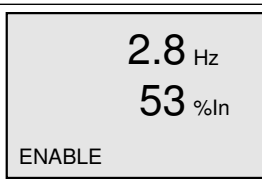
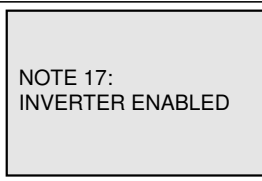
## 15.4 Operating MOVIFIT® FC with the DBG keypad

### 15.4.1 Selecting MOVIFIT® FC power section

| Step | Procedure                                                                                                                                                                                                                                                                                                                                         | Figure                                                                              |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1    | Select the required language (see chapter "Selecting a language" (→ 244)).                                                                                                                                                                                                                                                                        |                                                                                     |
| 2    | Use the  or the  key to select the MOVIFIT® FC power section (SBus address 1).<br>The DBG keypad searches for the connected units and displays them in the unit selection list. |                                                                                     |
| 3    | Press the  key to confirm your selection.<br>The [BASIC DISPLAY] menu opens.                                                                                                                                                                                     |  |

### 15.4.2 Basic display

The [BASIC DISPLAY] menu represents important characteristic values.

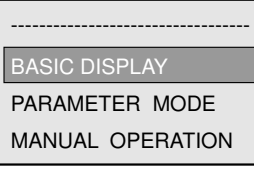
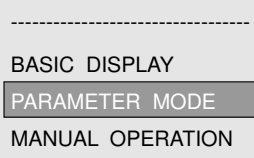
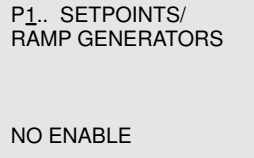
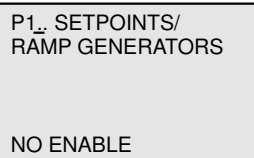
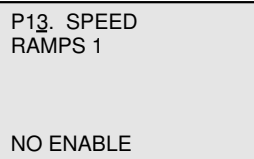
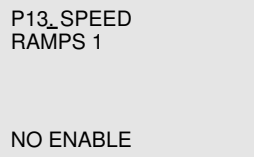
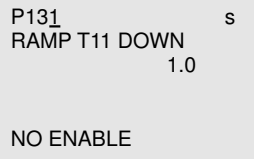
| Basic display                            | Figure                                                                                |
|------------------------------------------|---------------------------------------------------------------------------------------|
| Display for inhibited frequency inverter |  |
| Display for enabled frequency inverter   |  |
| Information message                      |  |
| Fault display                            |  |

## 15.4.3 Setting parameter mode

In the [PARAMETER MODE] menu, you can check and change parameter settings.

**INFORMATION**

Parameters can only be set in "Expert mode".

| Step | Procedure                                                                                                                                                                                                                                                                                                                  | Figure                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Use the  key to activate the context menu.                                                                                                                                                                                                |    |
| 2    | Use the  key to select the [PARAMETER MODE] command.                                                                                                                                                                                      |    |
| 3    | Use the  key to start parameter mode.<br>The first display parameter P000 "SPEED" is displayed.                                                                                                                                           |                                                                                       |
| 4    | Use the  or the  key to select the main parameter groups 0 – 9.                                                                                      |  |
| 5    | Press the  key to activate the selection of the parameter subgroup in the required main parameter group.<br>The flashing cursor moves one position to the right.                                                                        |  |
| 6    | Use the  or the  key to select the required parameter subgroup.<br>The flashing cursor is positioned under the second digit of the parameter number. |  |
| 7    | Press the  key to activate the parameter selection in the required parameter subgroup.<br>The flashing cursor moves one position to the right.                                                                                          |  |
| 8    | Use the  or the  key to select the required parameter.<br>The flashing cursor is positioned under the third digit of the parameter number.           |  |

| Step | Procedure                                                                                                                                                                                                                                                                                                                                                                       | Figure                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 9    | Use the  key to activate the setting mode for the selected parameter.<br>The cursor is positioned under the parameter value.                                                                                                                                                                   | P131 RAMP T11 DOWN s<br>1.0_<br>NO ENABLE                    |
| 10   | Use the  or the  key to set the required parameter value.                                                                                                                                                     | P131 RAMP T11 DOWN s<br>1.3_<br>NO ENABLE                    |
| 11   | Use the  key to confirm the settings and use the  key to exit the setting mode.<br>The flashing cursor is positioned under the third digit of the parameter number again.                                     | P131 RAMP T11 DOWN s<br>1.3<br>NO ENABLE                     |
| 12   | Use the  or the  key to select another parameter or use the  key to go back to the parameter subgroup menu.                  | P13. SPEED RAMP<br>RAMPS 1<br>NO ENABLE                      |
| 13   | Use the  or the  key to select another parameter subgroup or use the  key to go back to the main parameter group menu. | P1.. SETPOINTS/<br>RAMP GENERATORS<br>NO ENABLE              |
| 14   | Use the  key to go back to the context menu.                                                                                                                                                                                                                                                 | -----<br>BASIC DISPLAY<br>PARAMETER MODE<br>MANUAL OPERATION |

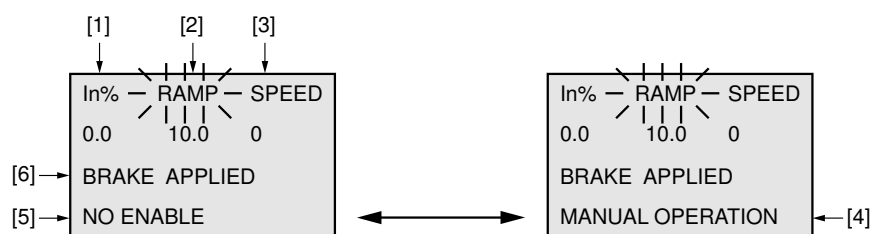
#### 15.4.4 Manual operation

Proceed as follows:

- Switch to manual operation (see chapter "Activating manual operation" (→ 245)).

#### Functions in manual operation mode

The following displays are toggled about every 2 s during manual operation:



792873483

- |                                              |                                 |
|----------------------------------------------|---------------------------------|
| [1] Output current in % in relation to $I_N$ | [4] Display of manual operation |
| [2] Acceleration <sup>1)</sup>               | [5] Inverter status             |
| [3] Speed in $\text{min}^{-1}$               | [6] Brake status                |

1) Speed ramps in s in relation to a setpoint step change of 1500 1/min

The following functions can be executed in the [MANUAL OPERATION] menu:

- Setting the ramp time
- Changing parameters
- Entering the speed
- Starting the drive
- Stopping the drive
- Releasing the brake without drive enable
- Deactivating manual operation

#### Setting the ramp time

Proceed as follows:

1. Press the key.
2. Use the or the key to set the required ramp time.
3. Press the key to confirm your entry.

#### Changing parameters

Proceed as follows:

1. Use the key to switch between parameters "RAMP", "SPEED" and "BRAKE".
2. Press the key to confirm your entry.

*Entering the speed*

Proceed as follows:

1. Use the  key to switch to the "SPEED" parameter.  
⇒ The DBG keypad shows the currently set "SPEED" parameter as flashing.
2. Enter the desired speed for manual operation using the digit keys 0 – 9. As an alternative, you can change the speed with the  or the  key.

**INFORMATION**

The sign indicates the direction of rotation of the motor connected to the MOVIFIT® unit.

3. Press the  key to confirm your entry.

*Starting the drive*

Proceed as follows:

- Use the  key to start the drive.  
During operation, the keypad displays the current motor current as a relative value in percentage. The motor current refers to the nominal motor current  $I_N$ .

*Stopping the drive*

Proceed as follows:

- Use the  key to stop the drive.

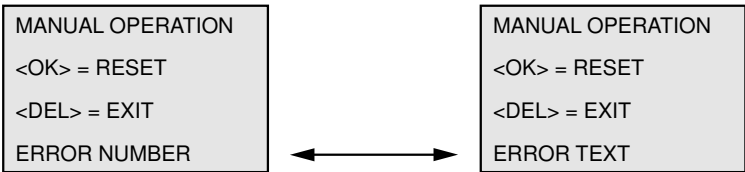
*Releasing the brake without drive enable*

Proceed as follows:

1. Use the  key to select the [BRAKE] command.  
⇒ The [BRAKE] command is flashing.
2. Use the  or the  key to release or apply the brake without enabling the drive.
3. Press the  key to confirm your selection.

Resetting faults

If a fault occurs during manual operation, the display shows the following message. The display toggles about every 2 s.



793021579

| Step | Procedure                                                                                                                                                             | Figure                                          |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 1    | Press the  key to reset the fault.<br>A message is displayed during the fault reset. | <div>MANUAL OPERATION<br/>PLEASE WAIT ...</div> |
|      | After the fault reset, manual operation remains active. The manual operation display is displayed again.                                                              |                                                 |

Deactivating manual operation



**▲ WARNING**

Risk of crushing if the drive connected to the MOVIFIT® unit starts up unintentionally when manual operation is deactivated. The process data of the master take effect upon deactivation. The enable signal may be present via the process data.

Severe or fatal injuries.

- Before deactivating manual operation, set the process data in such way that the drive connected to the MOVIFIT® unit is not enabled.
- Change the process data only after deactivating manual operation.

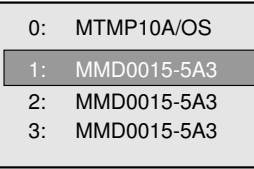
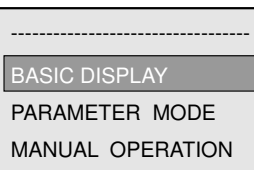
| Step | Procedure                                                                                                                                                                                                                                           | Figure                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| 1    | Use the  or the  key to deactivate manual operation.<br>A query is displayed. | <div>ACTIVATE<br/>AUTOMATIC MODE ?<br/><br/>DEL=NO      OK=YES</div>       |
| 2    | Press the  key.<br>The context menu opens.                                                                                                                       | <div>-----<br/>BASIC DISPLAY<br/>PARAMETER MODE<br/>MANUAL OPERATION</div> |

21361797/EN – 12/2015



## 15.5 Operating MOVIFIT® MC with the DBG keypad

### 15.5.1 Selecting MOVIFIT® MC power section

| Step | Procedure                                                                                                                                                                                                                                                                                                                                                                                    | Figure                                                                              |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1    | Select the required language (see chapter "Selecting a language" (→ 244)).                                                                                                                                                                                                                                                                                                                   |                                                                                     |
| 2    | Use the  or the  key to select the required MOVIMOT® power section. Up to 3 MOVIMOT® power sections can be connected.<br><br>The DBG keypad searches for the connected units and displays them in the unit selection list. |  |
| 3    | Press the  key to confirm your selection.<br><br>The [BASIC DISPLAY] menu opens.                                                                                                                                                                                                                            |  |

### 15.5.2 Executing other functions

For further information on functions and selection options, refer the operating instructions of the respective MOVIMOT® inverter.

## 16 Service

### NOTICE

Damage to the MOVIFIT® unit due to improper operation.

Damage to the MOVIFIT® unit.

- Maintenance and repair work may only be performed by qualified personnel.
- Please contact SEW-EURODRIVE in case of problems.

Faults of the MOVIFIT® unit are displayed:

- For MOVIFIT® FC/SC and MOVIMOT® in the status word of the power section (see chapter "Process data description in transparent mode" (→ 120)).
- In the MOVITOOLS® MotionStudio engineering software in the online device status of the power section.
- In the MOVITOOLS® MotionStudio engineering software in the parameter tree of the power section under the following parameters:
  - *P012 Fault status*
  - *P080 – P084 Fault memory 0 – 4*
- When connected to the Transparent mode application module in the MOVIFIT® Gateway Configurator.

### 16.1 Fault list MOVIFIT® MC

The faults related to MOVIFIT® MC occur in the connected MOVIMOT® inverter.

For the MOVIMOT® fault list, refer to the MOVIMOT® operating instructions.

## 16.2 Fault list MOVIFIT® SC

The following table lists the faults that can occur with MOVIFIT® SC:

The factory set error response is listed in the "Response" column. (P) indicates that the response is programmable.

| Code | Meaning            | Response                | Sub-code | Meaning                                                                 | Possible cause                                                                                                                                                                                                                                                                                                                    | Measure                                                                                                                                                                                                                                                                             |
|------|--------------------|-------------------------|----------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00   | No error           | —                       | —        | —                                                                       | —                                                                                                                                                                                                                                                                                                                                 | —                                                                                                                                                                                                                                                                                   |
| 01   | Overcurrent        | Immediate stop          | 3        | Overcurrent fault/limits drive 1                                        | The measured output current of drive 1 and 2 exceeds the parameterized interrupting current over the parameterized delay time.                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Check the parameterization.</li> <li>Reduce the drive load.</li> </ul>                                                                                                                                                                       |
|      |                    |                         | 4        | Overcurrent fault/limits drive 2                                        |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 06   | Line phase failure | Immediate stop          | 1        | Line phase failure error/line phase failure during initialization phase | A line phase failure has occurred during the power supply detection.<br><br><b>INFORMATION: The failure of 2 line phases does not lead to the error "Line phase failure". Instead, the state "Not ready, 24 V" is displayed without an error display.</b>                                                                         | Check supply system cable after phase failure.                                                                                                                                                                                                                                      |
|      |                    |                         | 2        | Line phase failure error/line phase failure with running system         |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 09   | Startup            | Immediate stop (P) P201 | 99       | Startup error/connection sequence of line phases                        | In dual-motor operation operating mode, mains phases L1, L2, and L3 must be connected in correct order to the terminals in the unit. Only if the motor phases are connected correctly, both motors have the direction of rotation "clockwise". The MOVIFIT® unit detects an incorrect line phase sequence and generates an error. | <ul style="list-style-type: none"> <li>Check the connection sequence of line phases.</li> <li>Ensure a clockwise rotating field by switching the 2 line phases.</li> </ul>                                                                                                          |
|      |                    | Immediate stop          | 100      | Startup error/motor connection drive 2                                  | In single-motor operating mode only: <ul style="list-style-type: none"> <li>Motor is connected to the incorrect terminal (X9 instead of X8).</li> <li>2 motors are connected.</li> </ul>                                                                                                                                          | <ul style="list-style-type: none"> <li>Connect the motor to the correct terminal (X8).</li> <li>Disconnect the terminal for the second motor (X9).</li> </ul> <b>NOTICE: In single-motor operating mode, only one drive can be connected at the terminals provided for drive 1.</b> |
| 11   | Overtemperature    | Immediate stop          | 1        | Overtemperature error axis module/heat sink temperature exceeded        | The measured heat sink temperature has exceeded the permitted limit value.                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Reduce the ambient temperature.</li> <li>Avoid heat build-up.</li> <li>Reduce the drive load.</li> </ul>                                                                                                                                     |
|      |                    |                         | 4        | Overtemperature error axis module/utilization in S3 duty cycle          | In dual-motor operating mode only: The total drive utilization if the drives is too high.                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Reduce the load.</li> <li>Make sure that the unit is cooled.</li> </ul>                                                                                                                                                                      |
| 17   | System error       | Immediate stop          | 0        | Stack overflow error                                                    | Starter electronics disrupted, possibly due to EMC issues.                                                                                                                                                                                                                                                                        | Check grounding and shielding and improve, if necessary. If this error reoccurs, contact SEW-EURODRIVE.                                                                                                                                                                             |
|      |                    |                         | 35       | Non maskable interrupt                                                  |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 18   | System error       | Immediate stop          | 103      | Illegal interrupt occurred                                              | Starter electronics disrupted, possibly due to EMC issues.                                                                                                                                                                                                                                                                        | Check grounding and shielding and improve, if necessary. If this error reoccurs, contact SEW-EURODRIVE.                                                                                                                                                                             |
| 20   | System error       | Immediate stop          | 0        | Undefined opcode error                                                  |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 21   | System error       | Immediate stop          | 0        | Protection fault                                                        |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 22   | System error       | Immediate stop          | 0        | Illegal word operand access                                             |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |
| 23   | System error       | Immediate stop          | 0        | Illegal instruction access                                              |                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                     |

21361797/EN – 12/2015

| Code | Meaning                                | Response                       | Sub-code | Meaning                                                              | Possible cause                                                                                                                                                                                                                    | Measure                                                                                                                                                                                                                                                                                                                          |
|------|----------------------------------------|--------------------------------|----------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25   | EEPROM                                 | Immediate stop                 | 0        | EEPROM error                                                         | Error while accessing EEPROM                                                                                                                                                                                                      | Restore the delivery state (parameter <i>P802</i> ). Perform the start-up again.<br>If this error reoccurs, contact SEW-EURODRIVE.                                                                                                                                                                                               |
| 26   | External terminal                      | Immediate stop (P) <i>P830</i> | 0        | Fault at external terminal (only at SBus slave)                      | "0" signal is present at terminal which has been programmed for functionality "/external error".                                                                                                                                  | Eliminate the cause of the error. Reprogram terminal if necessary.                                                                                                                                                                                                                                                               |
| 31   | TF/TH trigger                          | Immediate stop (P) <i>P835</i> | 100      | TF/TH motor temperature protection fault/TF signal drive 1           | <ul style="list-style-type: none"> <li>Motor too hot, TF/TH has triggered.</li> <li>TF/TH not connected or connected incorrectly.</li> <li>Connection between the MOVIFIT® unit and TF/TH is interrupted at the motor.</li> </ul> | <ul style="list-style-type: none"> <li>Allow the motor to cool. Reset the fault.</li> <li>Check the connections between the MOVIFIT® unit and TF/TH.</li> <li>If no TF/TH is connected, install jumper X81:1 with X81:2 (drive 1) or X91:1 with X91:2 (drive 2).</li> <li>Set parameter <i>P835</i> to "No reaction".</li> </ul> |
|      |                                        |                                | 101      | TF/TH motor temperature protection fault/TF signal drive 2           |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |
| 37   | System watchdog                        | Immediate stop                 | 0        | System watchdog overflow error                                       | Error while executing the system software                                                                                                                                                                                         | Contact SEW-EURODRIVE.                                                                                                                                                                                                                                                                                                           |
| 44   | Unit utilization                       | Immediate stop                 | 100      | Ixt utilization error/Ixt utilization (total current drives 1 and 2) | The total current from the measured output currents of drives 1 and 2 exceeds 180% $I_N$ .                                                                                                                                        | <ul style="list-style-type: none"> <li>Reduce the drive load.</li> <li>Avoid enabling both drives at the same time.</li> </ul>                                                                                                                                                                                                   |
| 45   | Initialization supply system detection | Immediate stop                 | 9        | Fault system initialization                                          | Unable to detect line phase sequence.                                                                                                                                                                                             | Check the line connection of the unit. Make sure a 3-phase power supply is connected correctly.<br><b>INFORMATION: The MOVIFIT® unit automatically detects line phase sequences.</b>                                                                                                                                             |
| 47   | System bus 1 timeout                   | Immediate stop (P) <i>P836</i> | 0        | Error timeout SBus 1/timeout system bus (CAN) 1                      | Error during communication via internal system bus                                                                                                                                                                                | Check system bus connection between master and slave at the slave.<br>If this error reoccurs, contact SEW-EURODRIVE.                                                                                                                                                                                                             |
| 82   | Open output                            | Immediate stop (P) <i>P839</i> | 2        | Output error/open output drive 1                                     | The current to the motor (measured) is lower than 1% of $I_N$ .                                                                                                                                                                   | Check the connection between the MOVIFIT® unit and the motor(s).                                                                                                                                                                                                                                                                 |
|      |                                        |                                | 3        | Output error/open output drive 2                                     |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |
| 84   | Motor protection                       | Immediate stop                 | 5        | Motor temperature simulation error/utilization S3 duty cycle drive 1 | Cycle monitoring time of drive 1/2 has triggered.                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Reduce the drive load.</li> <li>Reduce the switching frequency.</li> </ul>                                                                                                                                                                                                                |
|      |                                        |                                | 6        | Motor temperature simulation error/utilization S3 duty cycle drive 2 |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |
|      |                                        |                                | 7        | Motor temperature simulation error UL monitoring drive 1             | $I_N$ UL monitoring has triggered.                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Remove blocking of the drive.</li> <li>Reduce the drive load.</li> </ul>                                                                                                                                                                                                                  |
|      |                                        |                                | 8        | Motor temperature simulation error UL monitoring drive 2             |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |
|      |                                        |                                | 9        | Motor temperature simulation error Drive 1                           | When motor 1/2 reaches a thermal utilization of 110%, the unit shuts down.                                                                                                                                                        | <ul style="list-style-type: none"> <li>Reduce the drive load.</li> <li>Reduce the ambient temperature.</li> <li>Avoid heat build-up.</li> </ul>                                                                                                                                                                                  |
|      |                                        |                                | 10       | Motor temperature simulation error Drive 2                           |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                  |

| Code | Meaning                | Response       | Sub-code | Meaning                                | Possible cause                                             | Measure                                                                                                                                                                                                                   |
|------|------------------------|----------------|----------|----------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 89   | Thermal overload brake | Immediate stop | 2        | Thermal brake overload error/drive 1   | Cycle monitoring has triggered for brake 1/2.              | Reduce the starting frequency for releasing the brake without enable.                                                                                                                                                     |
|      |                        |                | 3        | Thermal brake overload error/drive 2   |                                                            |                                                                                                                                                                                                                           |
| 94   | EEPROM checksum        | Immediate stop | 0        | Checksum error/power section parameter | Starter electronics disrupted, possibly due to EMC issues. | Send the unit to SEW-EURODRIVE for repair.                                                                                                                                                                                |
| 97   | Copy error             | Immediate stop | 0        | Copy parameter error                   | Error during data transmission                             | <ul style="list-style-type: none"> <li>• Repeat the copying process.</li> <li>• Restore the delivery state (parameter <i>P802</i>). Repeat the copying process.</li> </ul> If this error reoccurs, contact SEW-EURODRIVE. |

### 16.3 Fault list MOVIFIT® FC

The following table lists the faults that can occur with MOVIFIT® FC:

The factory set error response is listed in the "Response" column. (P) indicates that the response is programmable.

| Code | Meaning             | Response       | Sub-code | Meaning                   | Possible cause                                                                                                                                                                                                                | Measure                                                                                                                                                                                                                                                                               |
|------|---------------------|----------------|----------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00   | No error            | —              | —        | —                         | —                                                                                                                                                                                                                             | —                                                                                                                                                                                                                                                                                     |
| 01   | Overcurrent         | Immediate stop | 0        | Overcurrent error         | <ul style="list-style-type: none"> <li>• Short circuit at output.</li> <li>• Motor too big.</li> <li>• Output stage defective.</li> <li>• Ramp time too short.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• Remove the short circuit.</li> <li>• Connect the smaller motor.</li> <li>• If the output stage is defective, contact SEW-EURODRIVE.</li> <li>• Extend the ramp time.</li> </ul>                                                              |
| 04   | Brake chopper       | Immediate stop | 0        | Brake chopper error       | <ul style="list-style-type: none"> <li>• Too much generative power.</li> <li>• Braking resistor circuit interrupted.</li> <li>• Short circuit in braking resistor circuit.</li> <li>• Braking resistance too high.</li> </ul> | <ul style="list-style-type: none"> <li>• Extend the deceleration ramp.</li> <li>• Check brake chopper supply cables.</li> <li>• Check the technical data of the braking resistor.</li> <li>• Replace the MOVIFIT® unit if the brake chopper is defective.</li> </ul>                  |
| 06   | Line phase failure  | Immediate stop | 0        | Line phase failure error  | Line phase failure                                                                                                                                                                                                            | Check supply system cable.                                                                                                                                                                                                                                                            |
| 07   | DC link overvoltage | Immediate stop | 0        | DC link overvoltage error | DC link voltage too high.                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Extend the deceleration ramp.</li> <li>• Check the braking resistor connection.</li> <li>• Check the technical data of the braking resistor.</li> </ul>                                                                                      |
| 08   | Speed monitoring    | Immediate stop | 0        | Speed monitoring error    | Motor and regenerative speed monitoring function has triggered.                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Reduce the load.</li> <li>• Increase the deceleration time (parameter <i>P501/P503</i>).</li> <li>• Check current limiting.</li> <li>• Extend the ramp times.</li> <li>• Check the motor cable.</li> <li>• Check the line phases.</li> </ul> |

| Code | Meaning            | Response                       | Sub-code | Meaning                                                                              | Possible cause                                                                                                                      | Measure                                                                                                                                                                                                     |
|------|--------------------|--------------------------------|----------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09   | Startup            | Immediate stop                 | 0        | Startup error/startup missing                                                        | No motor startup performed.                                                                                                         | Perform the startup in Easy mode (DIP switch) or in Expert mode (MOVITOOLS® MotionStudio).                                                                                                                  |
|      |                    |                                | 4        | Startup error/invalid motor power                                                    | Invalid motor started up in expert mode (MOVITOOLS® MotionStudio).                                                                  | <ul style="list-style-type: none"> <li>Perform the motor startup again.</li> <li>Check the motor data. Correct the data if necessary.</li> </ul>                                                            |
|      |                    |                                | 7        | Startup error/automatic brake selection function is not available with this firmware | Parameters of an older MOVIFIT® FC has been copied to a newer MOVIFIT® FC version. Faults can occur depending on the constellation. | Perform the startup of the MOVIFIT® FC again (motor and brake startup).                                                                                                                                     |
|      |                    |                                | 11       | Illegal motor connection type                                                        | The motor connection type is not assigned to this motor-frequency inverter combination.                                             | Perform the startup in Easy mode (DIP switch) or in Expert mode (MOVITOOLS® MotionStudio).                                                                                                                  |
|      |                    |                                | 13       | Invalid motor data                                                                   | Motor protection function set to "ON" although no motor protection factors are available in the internal data set.                  | Deactivate the motor protection function or perform the startup in Expert mode (MOVITOOLS® MotionStudio).                                                                                                   |
|      |                    |                                | 15       | Invalid unit power SK25                                                              | Incorrect unit power for SK25                                                                                                       | Note that only units with a power rating of 1,5 KW or 4,0 KW are permitted.                                                                                                                                 |
| 11   | Overtemperature    | Rapid stop                     | 10       | Overtemperature error                                                                | Thermal overload of the frequency inverter.                                                                                         | <ul style="list-style-type: none"> <li>Reduce the load.</li> <li>Make sure that the unit is cooled.</li> </ul>                                                                                              |
| 15   | Electronics supply | Immediate stop                 | 0        | 24 V internal error                                                                  | Voltage continuously $\leq 18$ V (min.1 s)                                                                                          | Check the 24 V voltage supply.                                                                                                                                                                              |
| 17   | System error       | Immediate stop                 | 0        | Stack overflow error                                                                 | Inverter electronics disrupted, possibly due to EMC influences.                                                                     | Check grounding and shielding and improve, if necessary. If this error reoccurs, contact SEW-EURODRIVE.                                                                                                     |
| 18   | System error       | Immediate stop                 | 0        | Stack underflow error                                                                |                                                                                                                                     |                                                                                                                                                                                                             |
| 19   | System error       | Immediate stop                 | 0        | External NMI error                                                                   |                                                                                                                                     |                                                                                                                                                                                                             |
| 20   | System error       | Immediate stop                 | 0        | Undefined opcode error                                                               |                                                                                                                                     |                                                                                                                                                                                                             |
| 21   | System error       | Immediate stop                 | 0        | Protection fault                                                                     |                                                                                                                                     |                                                                                                                                                                                                             |
| 22   | System error       | Immediate stop                 | 0        | Illegal word operand access error                                                    |                                                                                                                                     |                                                                                                                                                                                                             |
| 23   | System error       | Immediate stop                 | 0        | Illegal instruction access error                                                     |                                                                                                                                     |                                                                                                                                                                                                             |
| 24   | System error       | Immediate stop                 | 0        | Illegal external bus access error                                                    |                                                                                                                                     |                                                                                                                                                                                                             |
| 25   | EEPROM             | Immediate stop                 | 0        | EEPROM error                                                                         | Error while accessing EEPROM                                                                                                        | <ul style="list-style-type: none"> <li>Restore the delivery state (parameter <i>P802</i>). Perform the startup again.</li> <li>Exchange the ABOX.</li> </ul> If this error reoccurs, contact SEW-EURODRIVE. |
| 26   | External terminal  | Immediate stop (P) <i>P830</i> | 0        | External terminal error                                                              | External enable signal read at programmable input.                                                                                  | Eliminate the cause of the error. Reprogram terminal if necessary.                                                                                                                                          |

21361797/EN – 12/2015

| Code | Meaning                | Response                          | Sub-code | Meaning                                                              | Possible cause                                                                                                                                                                                                                                                                                          | Measure                                                                                                                                                                                                                                                                                  |
|------|------------------------|-----------------------------------|----------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31   | TF/TH trigger          | Immediate stop (P)<br><i>P835</i> | 8        | TF/TH thermal motor protection error/motor overtemperature / (TF/TH) | <ul style="list-style-type: none"> <li>Motor too hot, TF/TH has triggered.</li> <li>TF/TH not connected or connected incorrectly.</li> <li>Connection between the MOVIFIT® unit and TF/TH is interrupted at the motor.</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>Allow the motor to cool. Reset the fault.</li> <li>Check the connections between the MOVIFIT® unit and TF/TH.</li> <li>If no TF/TH is connected, install jumper X81:1 with X81:2.</li> <li>Set parameter <i>P835</i> to "No reaction".</li> </ul> |
| 37   | System watchdog        | Immediate stop                    | 0        | System watchdog overflow error                                       | Error while executing the system software.                                                                                                                                                                                                                                                              | Contact SEW-EURODRIVE.                                                                                                                                                                                                                                                                   |
| 38   | System software        | Immediate stop                    | 0        | System software error                                                | System error                                                                                                                                                                                                                                                                                            | Contact SEW-EURODRIVE.                                                                                                                                                                                                                                                                   |
| 45   | Initialization         | Immediate stop                    | 0        | System initialization error/general error during initialization      | Faulty or missing data in power section                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Restore the delivery state (parameter <i>P802</i>). Perform the startup again.</li> <li>Exchange the ABOX.</li> </ul> If this error reoccurs, contact SEW-EURODRIVE.                                                                              |
| 47   | System bus 1 timeout   | Immediate stop (P)<br><i>P836</i> | 0        | Error timeout SBus 1/timeout system bus (CAN) 1                      | Error during communication via internal system bus                                                                                                                                                                                                                                                      | Check system bus connection between master and slave at the slave. If this error reoccurs, contact SEW-EURODRIVE.                                                                                                                                                                        |
| 80   | RAM test               | Immediate stop                    | 0        | RAM test error                                                       | Internal unit fault, RAM defective.                                                                                                                                                                                                                                                                     | Contact SEW-EURODRIVE.                                                                                                                                                                                                                                                                   |
| 81   | Start condition        | Immediate stop                    | 0        | Start condition error/start condition error with VFC hoist           | Only in VFC hoist operating mode:<br>The motor could not be supplied with the correct amount of current during the pre-magnetization time: <ul style="list-style-type: none"> <li>Nominal motor power too small in relation to inverter power.</li> <li>Motor cable cross section too small.</li> </ul> | <ul style="list-style-type: none"> <li>Check the startup data. Perform the startup again if necessary.</li> <li>Check the connection between the frequency inverter unit and the motor.</li> <li>Check the cross section of the motor cable. Increase it if required.</li> </ul>         |
| 82   | Open output            | Immediate stop                    | 0        | Output error/open output with VFC hoist                              | No connection between the MOVIFIT® unit and motor during enable.                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Check the connection between the MOVIFIT® unit and the motor.</li> <li>Check the startup data. Perform the startup again if necessary.</li> </ul>                                                                                                 |
|      |                        |                                   | 4        | Output error/output phase failure                                    | At least one phase failed at motor.                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                          |
| 84   | Motor protection       | Immediate stop (P)<br><i>P340</i> | 0        | Motor temperature simulation error                                   | <ul style="list-style-type: none"> <li>Motor utilization is too high.</li> <li>UL monitoring has triggered, limit value exceeded for at least 1 minute.</li> </ul>                                                                                                                                      | <ul style="list-style-type: none"> <li>Reduce the drive load.</li> <li>Check the motor for blocking. Remove the blocking, if present.</li> <li>Extend pause times.</li> <li>Use a larger motor.</li> </ul>                                                                               |
| 89   | Thermal overload brake | Immediate stop                    | 0        | Thermal brake overload error                                         | <ul style="list-style-type: none"> <li>Brake overtemperature</li> <li>Incorrect motor/frequency inverter assignment.</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Check the motor/frequency inverter combination.</li> <li>If the motor works in regenerative operation, use a braking resistance or extend the existing one.</li> <li>Extend the stop ramp.</li> </ul>                                             |



| Code | Meaning                | Response       | Sub-code | Meaning                                                           | Possible cause                                                                                         | Measure                                                                                                                                                                                        |
|------|------------------------|----------------|----------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 90   | Output stage detection | Immediate stop | 0        | Wrong output stage detection error                                | Illegal combination of motor and frequency inverter.                                                   | <ul style="list-style-type: none"> <li>Check the startup data. Perform the startup again if necessary.</li> <li>The motor does not match the frequency inverter. Replace the motor.</li> </ul> |
| 94   | EEPROM checksum        | Immediate stop | 0        | Checksum error/power section parameter                            | Inverter electronics disrupted, possibly due to EMC influences.                                        | Send the unit to SEW-EURODRIVE for repair.                                                                                                                                                     |
| 97   | Copy error             | Immediate stop | 0        | Copy parameter error                                              | Error during data transmission                                                                         | <ul style="list-style-type: none"> <li>Repeat the copying process.</li> <li>Restore the delivery state (parameter <i>P802</i>). Repeat the copying process.</li> </ul>                         |
|      |                        |                | 1        | Fault copy parameter set/cancel download of parameter set to unit |                                                                                                        |                                                                                                                                                                                                |
| 98   | CRC error              | Immediate stop | 0        | CRC via internal flash memory error                               | <ul style="list-style-type: none"> <li>Internal unit error</li> <li>Flash memory defective.</li> </ul> | Send the unit to SEW-EURODRIVE for repair.                                                                                                                                                     |

## 16.4 Transparent mode fault list

### 16.4.1 Notes

The abbreviation "PS" in the fault tables designates the power section of one of the following units, depending on the system:

- MOVIFIT® SC/FC power section
- MOVIMOT® (for systems with MOVIFIT® MC)
- Power section of MOVIFIT® SBus slaves

#### Example: MOVIFIT® FC and 6 SBus slaves

| Power section "PS" | Unit                                   |
|--------------------|----------------------------------------|
| 1                  | Integrated power section (MOVIFIT® FC) |
| 2                  | SBus slave 1                           |
| 3                  | SBus slave 2                           |
| 4                  | SBus slave 3                           |
| 5                  | SBus slave 4                           |
| 6                  | SBus slave 5                           |
| 7                  | SBus slave 6                           |

#### Example: MOVIFIT® MC with 3 MOVIMOT® and 6 SBus slaves

| Power section "PS" | Unit         |
|--------------------|--------------|
| 1                  | MOVIMOT® 1   |
| 2                  | MOVIMOT® 2   |
| 3                  | MOVIMOT® 3   |
| 4                  | SBus slave 1 |
| 5                  | SBus slave 2 |
| 6                  | SBus slave 3 |
| 7                  | SBus slave 4 |
| 8                  | SBus slave 5 |
| 9                  | SBus slave 6 |

## 16.4.2 Fault list

The following table lists the faults that may occur in conjunction with the transparent mode application module.

| Code | Meaning               | Subcode | Meaning                                                                                 | Possible cause                                                                                                                                                              | Measure                                                                                                                                                                                                                                                                        |
|------|-----------------------|---------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00   | No fault              | –       | –                                                                                       | –                                                                                                                                                                           | –                                                                                                                                                                                                                                                                              |
| 111  | Communication timeout | 0xLT02  | Communication timeout during startup to a configured station/station cannot be reached. | Communication to configured internal power section or external slave interrupted.                                                                                           | <ul style="list-style-type: none"> <li>Check the electrical installation.</li> <li>Check the configuration.</li> </ul>                                                                                                                                                         |
| 121  | Unit replacement      | 0x28    | Fault while accessing storage medium                                                    | Internal unit fault                                                                                                                                                         | Contact SEW-EURODRIVE. If this occurs repeatedly, send the unit to SEW-EURODRIVE for repair.                                                                                                                                                                                   |
|      |                       | 0x29    | Invalid data in storage medium                                                          | Invalid data is stored in ABOX.                                                                                                                                             | Perform a data backup.                                                                                                                                                                                                                                                         |
|      |                       | 0xLT20  | Fault during auto-update/ unable to read unit detection of a lower-level station.       | Incorrect firmware version of the slave. SBus overloaded.                                                                                                                   | <ul style="list-style-type: none"> <li>Check the SBus for additional load.</li> <li>Reduce the load on the SBus, e.g. by prohibiting engineering via SBus.</li> <li>Replace the power section.</li> </ul>                                                                      |
|      |                       | 0xLT22  | Internal unit fault                                                                     | Internal unit fault                                                                                                                                                         | Contact SEW-EURODRIVE. If this occurs repeatedly, send the unit to SEW-EURODRIVE for repair.                                                                                                                                                                                   |
|      |                       | 0xLT23  | Fault during auto-update/ download to lower-level station failed.                       | <ul style="list-style-type: none"> <li>Bus load on SBus is too high.</li> <li>Parameter lock is activated.</li> <li>Easy mode is activated at the MOVIFIT® unit.</li> </ul> | <ul style="list-style-type: none"> <li>Check the SBus for additional load.</li> <li>Reduce the load on the SBus, e.g. by prohibiting engineering via SBus.</li> <li>Activate Expert mode at the MOVIFIT® unit.</li> <li>Remove the parameter lock (parameter P803).</li> </ul> |
|      |                       | 0xLT24  | Fault during data backup/ upload from lower-level station failed.                       | Bus load on SBus is too high.                                                                                                                                               | <ul style="list-style-type: none"> <li>Check the SBus for additional load.</li> <li>Reduce the load on the SBus, e.g. by prohibiting engineering via SBus.</li> </ul>                                                                                                          |
| 239  | Internal fault        | 0x00    | Internal unit fault                                                                     | Internal unit fault                                                                                                                                                         | Contact SEW-EURODRIVE. If this occurs repeatedly, send the unit to SEW-EURODRIVE for repair.                                                                                                                                                                                   |
|      |                       | 0x01    |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0xLT01  |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0x10600 |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0x10610 |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0x10620 |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0x10630 |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |
|      |                       | 0x10710 |                                                                                         |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                |

## Index

## Numerical

|                                        |     |
|----------------------------------------|-----|
| 12-byte MOVILINK® parameter channel    |     |
| Activating the unit diagnostics .....  | 231 |
| Application example .....              | 228 |
| Management byte.....                   | 223 |
| Parameter access to units.....         | 225 |
| Process image in transparent mode..... | 233 |
| Services.....                          | 223 |
| Structure.....                         | 222 |
| Subrouting .....                       | 225 |

## A

|                                                       |     |
|-------------------------------------------------------|-----|
| Access to device parameters                           |     |
| Reading parameter (RSLogix 5000).....                 | 59  |
| Reading parameters (Studio 5000 Logix Designer) ..... | 67  |
| Writing parameter (RSLogix 5000).....                 | 63  |
| Writing parameters (Studio 5000 Logix Designer) ..... | 71  |
| Activating Expert mode .....                          | 135 |
| Activating the diagnostics                            |     |
| With 12-byte MOVILINK® parameter channel .....        | 231 |
| With S12 safety option .....                          | 216 |
| Additional documents .....                            | 11  |
| Address Editor                                        |     |
| Addressing Ethernet nodes .....                       | 151 |
| Designated use .....                                  | 29  |
| Searching Ethernet nodes.....                         | 150 |
| Starting .....                                        | 149 |
| Address range Modbus/TCP .....                        | 104 |
| Application modules                                   |     |
| Bus positioning .....                                 | 19  |
| Cam positioning.....                                  | 19  |
| Designated use .....                                  | 17  |
| For the MOVIFIT® unit.....                            | 18  |
| Transparent mode .....                                | 18  |
| Auto-crossing .....                                   | 26  |
| Auto-negotiation .....                                | 26  |

## B

|                        |     |
|------------------------|-----|
| Brake startup          |     |
| With MOVIFIT® FC ..... | 161 |
| With MOVIFIT® SC ..... | 158 |

## C

|                                                       |     |
|-------------------------------------------------------|-----|
| CIP                                                   |     |
| Assembly object .....                                 | 79  |
| Directory of objects.....                             | 76  |
| EtherNet link object .....                            | 88  |
| Identity object .....                                 | 77  |
| Message router object.....                            | 78  |
| Parameter object.....                                 | 83  |
| Register object .....                                 | 80  |
| TCP/IP interface object .....                         | 87  |
| Vardata object .....                                  | 86  |
| Common Industrial Protocol, see CIP .....             | 76  |
| Communication channel                                 |     |
| Configuring serial communication .....                | 144 |
| Configuring the communication via Ethernet .....      | 152 |
| Communication parameter                               |     |
| Configuring via Ethernet.....                         | 152 |
| Setting for SMLP server .....                         | 153 |
| Communication parameters                              |     |
| Configuring for serial communication .....            | 144 |
| For SMLP .....                                        | 154 |
| Communication ports .....                             | 155 |
| Configuration                                         |     |
| Communication via Ethernet .....                      | 152 |
| EtherNet/IP™ master .....                             | 46  |
| In transparent mode .....                             | 208 |
| Modbus/TCP master .....                               | 93  |
| Serial communication .....                            | 144 |
| Configuration example EtherNet/IP™                    |     |
| Accessing parameters .....                            | 58  |
| Configuring process data exchange .....               | 55  |
| Reading parameter (RSLogix 5000).....                 | 59  |
| Reading parameters (Studio 5000 Logix Designer) ..... | 67  |
| Writing parameter (RSLogix 5000).....                 | 63  |
| Writing parameters (Studio 5000 Logix Designer) ..... | 71  |
| Configuration example Modbus/TCP                      |     |
| Accessing parameters .....                            | 102 |
| Configuring process data exchange .....               | 97  |
| Data exchange .....                                   | 98  |
| Exchanging process data .....                         | 99  |
| Connecting the engineering interface.....             | 148 |
| Connection management Modbus/TCP .....                | 111 |

|                                                   |     |
|---------------------------------------------------|-----|
| Control word                                      |     |
| MOVIFIT® FC .....                                 | 130 |
| MOVIFIT® SC .....                                 | 127 |
| MOVIMOT® .....                                    | 124 |
| Copyright notice .....                            | 11  |
| Current value                                     |     |
| Coding for MOVIFIT® FC .....                      | 132 |
| Coding for MOVIFIT® SC .....                      | 129 |
| Coding for MOVIMOT® .....                         | 126 |
| <b>D</b>                                          |     |
| DBG keypad                                        |     |
| Activating manual operation .....                 | 245 |
| Connecting .....                                  | 243 |
| Context menu .....                                | 244 |
| Copy function .....                               | 246 |
| Description .....                                 | 241 |
| Key assignment .....                              | 242 |
| Language selection .....                          | 244 |
| Operating MOVIFIT® FC .....                       | 255 |
| Operating MOVIFIT® MC .....                       | 261 |
| Operating MOVIFIT® SC .....                       | 247 |
| Part numbers .....                                | 241 |
| DBG, see DBG keypad .....                         | 241 |
| Device description file                           |     |
| EtherNet/IP™ .....                                | 46  |
| Modbus/TCP .....                                  | 93  |
| Device Level Ring network, see DLR network ....   | 53  |
| DHCP                                              |     |
| Deactivate/Activate .....                         | 29  |
| Description .....                                 | 26  |
| DIP switch                                        |     |
| Setting default values of IP address .....        | 29  |
| Setting Expert mode .....                         | 135 |
| Setting in EBOX .....                             | 36  |
| Setting SBus slave addresses .....                | 35  |
| Setting type of address assignment .....          | 28  |
| DLR network                                       |     |
| Configuring hardware/software .....               | 54  |
| Rectifying ring faults .....                      | 53  |
| Ring fault detection .....                        | 53  |
| Topology .....                                    | 53  |
| Documentation, additional .....                   | 11  |
| Documents, additional .....                       | 11  |
| Dynamic Host Configuration Protocol, see DHCP ... | 26  |

**E**

|                                                   |        |
|---------------------------------------------------|--------|
| EDS file, see device description file .....       | 46     |
| Embedded safety notes .....                       | 10     |
| Engineering, MOVITOOLS® MotionStudio .....        | 136    |
| Error code of "explicit messages" .....           | 89     |
| By EtherNet/IP™ master .....                      | 89     |
| By EtherNet/IP™ slave .....                       | 90     |
| Due to timeout .....                              | 90     |
| General error codes .....                         | 91     |
| MOVILINK®-specific .....                          | 91     |
| Error codes Modbus/TCP .....                      | 116    |
| Error diagnostics (EtherNet/IP™, Modbus/TCP)      |        |
| Checking status display at the master .....       | 119    |
| Checking status LEDs .....                        | 118    |
| Diagnostic procedure .....                        | 118    |
| Ethernet Industrial Protocol, see EtherNet/IP™ .. | 75     |
| Ethernet net                                      |        |
| Connection of slaves .....                        | 33     |
| Ethernet switch .....                             | 26     |
| MOVIFIT® unit connection .....                    | 30     |
| Network topologies .....                          | 26     |
| Plug connector .....                              | 31, 33 |
| Setting IP address parameters .....               | 36     |
| Shielding and routing bus cables .....            | 27     |
| Ethernet nodes                                    |        |
| Addressing .....                                  | 151    |
| Search .....                                      | 150    |
| Ethernet plug connector .....                     | 31, 33 |
| Ethernet switch .....                             | 26     |
| Auto-crossing .....                               | 26     |
| Auto-negotiation .....                            | 26     |
| Multicast handling .....                          | 27     |
| EtherNet/IP™                                      |        |
| CIP objects .....                                 | 76     |
| Configuration .....                               | 46     |
| Configuring master .....                          | 46     |
| Description .....                                 | 75     |
| Device description file .....                     | 46     |
| DLR topology .....                                | 53     |
| EDS file .....                                    | 46     |
| Process data exchange .....                       | 75     |
| Project planning examples .....                   | 55, 58 |
| Return codes for parameterization .....           | 89     |
| Startup .....                                     | 46     |
| Technical data of interface .....                 | 92     |

|                                                  |    |
|--------------------------------------------------|----|
| Timeout behavior .....                           | 75 |
| EtherNet/IP™ master                              |    |
| Configuration with RSLogix 5000 .....            | 47 |
| Configuration with Studio 5000 Logix Designer .. | 50 |
| EtherNet/IP™ scanner, see EtherNet/IP™ master .. | 46 |
| Exclusion of liability .....                     | 11 |

## F

|                                              |     |
|----------------------------------------------|-----|
| Fault diagnostics (EtherNet/IP™, Modbus/TCP) |     |
| Checking fault sources .....                 | 119 |
| Communication timeout.....                   | 239 |
| Fault list                                   |     |
| MOVIFIT® FC .....                            | 266 |
| MOVIFIT® MC.....                             | 262 |
| MOVIFIT® SC .....                            | 263 |
| Transparent mode .....                       | 270 |
| FC16 – Write multiple registers .....        | 108 |
| FC23 – Read/write multiple registers .....   | 109 |
| FC3 – Read holding registers.....            | 107 |
| FC43 – Read device identifications.....      | 110 |
| Fieldbus gateway, see transparent mode ..... | 208 |

## G

|                                           |     |
|-------------------------------------------|-----|
| Gateway Configurator .....                | 209 |
| Displaying the process data exchange..... | 212 |
| Performing an auto setup .....            | 211 |
| Gateway mode, see transparent mode .....  | 208 |

## H

|                |    |
|----------------|----|
| Hazard symbols |    |
| Meaning.....   | 10 |

## I

|                                                 |     |
|-------------------------------------------------|-----|
| Inputs, process data exchange .....             | 123 |
| Installing drivers for USB11A on PC/laptop..... | 143 |
| Interface adapter, see USB11A.....              | 141 |
| IP address .....                                | 24  |
| IP address parameters .....                     | 24  |
| Change after initial startup .....              | 28  |
| Deactivate/Activate DHCP .....                  | 29  |
| Procedure for unit replacement.....             | 29  |
| Reset to default value.....                     | 29  |
| Setting at unit .....                           | 36  |
| Setting during initial startup .....            | 28  |
| Setting via Address Editor .....                | 29  |

## L

### Laptop

|                                           |     |
|-------------------------------------------|-----|
| Addressing .....                          | 151 |
| Checking the COM port of the USB11A ..... | 143 |
| Connect (engineering interface).....      | 148 |
| Connect (USB11A).....                     | 141 |
| Installing drivers for USB11A .....       | 143 |

### LED

|                     |    |
|---------------------|----|
| "24V-C" .....       | 37 |
| "24V-S" .....       | 38 |
| "DI.." .....        | 37 |
| "DO.." .....        | 37 |
| "link/act 1".....   | 44 |
| "link/act 2".....   | 44 |
| "MS" and "NS" ..... | 43 |
| "RUN PS" .....      | 39 |
| "SF/USR".....       | 38 |

## M

|                                                |        |
|------------------------------------------------|--------|
| MAC address.....                               | 24     |
| Modbus protocol, see Modbus/TCP .....          | 104    |
| Modbus/TCP                                     |        |
| Address range .....                            | 104    |
| Closing the connection .....                   | 112    |
| Configuration .....                            | 93     |
| Connection management .....                    | 111    |
| Description .....                              | 104    |
| Device description file .....                  | 93     |
| Error codes.....                               | 116    |
| Exception codes .....                          | 116    |
| Function codes .....                           | 105    |
| Parameter access .....                         | 113    |
| Project planning examples .....                | 97, 98 |
| Project planning, master.....                  | 93     |
| Protocol structure .....                       | 105    |
| Requesting controlling connection .....        | 111    |
| Send process output data .....                 | 111    |
| Services.....                                  | 105    |
| Startup.....                                   | 93     |
| Technical data of interface .....              | 117    |
| Timeout behavior.....                          | 112    |
| Modbus/TCP exception .....                     | 116    |
| Modbus/TCP function codes .....                | 105    |
| Modbus/TCP master                              |        |
| Addressing drive via "IO Scanning" function .. | 96     |

|                                                |          |                                               |         |
|------------------------------------------------|----------|-----------------------------------------------|---------|
| Configuring hardware (control structure).....  | 94       | Operating with keypad.....                    | 247     |
| Setting Ethernet component.....                | 95       | Parameter description .....                   | 176     |
| Modbus/TCP scanner, see Modbus/TCP master      | 93       | Parameter list for the power section.....     | 172     |
| Modbus/TCP services .....                      | 105      | Startup.....                                  | 22      |
| FC16 – Write multiple registers .....          | 108      | Status word .....                             | 128     |
| FC23 – Read/write multiple registers .....     | 109      | MOVIFIT® unit                                 |         |
| FC3 – Read holding registers.....              | 107      | Application modules .....                     | 18      |
| FC43 – Read device identifications.....        | 110      | Connection Ethernet.....                      | 30      |
| Motion libraries                               |          | Default values of IP address parameters ..... | 29      |
| for MOVIFIT® function level "Technology" ..... | 21       | Ethernet interfaces .....                     | 30      |
| Positioning application.....                   | 21       | Function level "Technology" .....             | 15      |
| Motor startup                                  |          | Functional safety .....                       | 13      |
| With MOVIFIT® FC .....                         | 161      | Inputs and outputs.....                       | 123     |
| With MOVIFIT® SC .....                         | 158      | LEDs for EtherNet/IP™ and Modbus/TCP .....    | 43      |
| MOVIFIT® FC                                    |          | LEDs, general.....                            | 37      |
| Activating Expert mode .....                   | 135      | Process image in transparent mode.....        | 120     |
| Control word .....                             | 130      | Requirements for fieldbus operation .....     | 54, 97  |
| Data exchange with inverter .....              | 129      | Status word .....                             | 121     |
| Data exchange with slave .....                 | 134      | Unit replacement .....                        | 236     |
| Fault list .....                               | 266      | MOVILINK®                                     |         |
| Manual operation using the DBG keypad.....     | 258      | Parameter channel.....                        | 114     |
| Motor/brake startup .....                      | 161      | Return code.....                              | 91      |
| Operating with keypad.....                     | 255      | Setting communication parameters.....         | 153     |
| Parameter description .....                    | 194      | MOVI-PLC®                                     |         |
| Parameter list for the power section.....      | 185      | Designated use .....                          | 20      |
| Startup.....                                   | 22       | Libraries.....                                | 20      |
| Status word 1 .....                            | 132      | MOVITOOLS® MotionStudio                       |         |
| Status word 2 .....                            | 133      | Communication channels .....                  | 136     |
| MOVIFIT® MC                                    |          | Communication ports .....                     | 155     |
| Data exchange with MOVIMOT® .....              | 124      | Configure unit .....                          | 140     |
| Fault list .....                               | 262      | Creating a project .....                      | 137     |
| MOVIMOT® control word .....                    | 124      | Designated use .....                          | 136     |
| MOVIMOT® status word 1 .....                   | 125      | Establishing communication via "EtherCAT"     |         |
| MOVIMOT® status word 2 .....                   | 126      | fieldbus .....                                | 137     |
| Operating with keypad.....                     | 261      | Functions.....                                | 16, 136 |
| Startup.....                                   | 23       | Reading/changing device parameters.....       | 156     |
| MOVIFIT® SC                                    |          | Setting the connection mode.....              | 137     |
| Activating Expert mode .....                   | 135      | Starting up unit .....                        | 157     |
| Control word .....                             | 127      | Multicast handling.....                       | 27      |
| Data exchange with motor starter .....         | 127      | <b>N</b>                                      |         |
| Data exchange with slave .....                 | 134      | Network class .....                           | 25      |
| Fault list .....                               | 263      | Notes                                         |         |
| Manual operation using the DBG keypad....      | 250, 258 | Designation in the documentation .....        | 9       |
| Motor/brake startup .....                      | 158      | Meaning of the hazard symbols .....           | 10      |

## O

### Object

|                        |    |
|------------------------|----|
| Assembly .....         | 79 |
| EtherNet link .....    | 88 |
| Identity .....         | 77 |
| Message router .....   | 78 |
| Parameter .....        | 83 |
| Register .....         | 80 |
| TCP/IP interface ..... | 87 |
| Vardata .....          | 86 |

|                                  |     |
|----------------------------------|-----|
| Opening the parameter tree ..... | 156 |
|----------------------------------|-----|

|                                      |     |
|--------------------------------------|-----|
| Outputs, process data exchange ..... | 123 |
|--------------------------------------|-----|

## P

### Parameter

|                                              |     |
|----------------------------------------------|-----|
| For startup with MOVIFIT® SC .....           | 158 |
| List for the MOVIFIT® SC power section ..... | 172 |

### Parameter access via EtherNet/IP™

|                              |    |
|------------------------------|----|
| CIP objects .....            | 76 |
| General Error Codes .....    | 91 |
| MOVILINK™ return codes ..... | 91 |
| Return code .....            | 89 |

### Parameter access via Modbus/TCP

|                                    |     |
|------------------------------------|-----|
| MOVILINK® parameter channel .....  | 114 |
| Procedure with FC16 and FC03 ..... | 113 |
| Procedure with FC23 .....          | 113 |
| Protocol structure .....           | 114 |

### Parameterizing the unit

|                                        |     |
|----------------------------------------|-----|
| About MOVITOOLS® MotionStudio .....    | 156 |
| Access to unit parameters .....        | 225 |
| Activating Expert mode .....           | 135 |
| Error codes for parameterization ..... | 226 |
| Response to the controller .....       | 226 |
| Subrouting .....                       | 225 |

### Parameters

|                                              |          |
|----------------------------------------------|----------|
| 0.. Display values .....                     | 176, 194 |
| 1.. Setpoints/ramp generators .....          | 178, 197 |
| 2.. Power supply .....                       | 179      |
| 3.. Motor parameters .....                   | 179, 199 |
| 5.. Control functions .....                  | 201      |
| 6.. Terminal assignment .....                | 180, 202 |
| 7.. Control functions .....                  | 181, 203 |
| 8.. Unit functions .....                     | 183, 205 |
| List for the MOVIFIT® FC power section ..... | 185      |

## PC

|                                           |     |
|-------------------------------------------|-----|
| Addressing .....                          | 151 |
| Checking the COM port of the USB11A ..... | 143 |
| Connect (engineering interface) .....     | 148 |
| Connect (USB11A) .....                    | 141 |
| Installing drivers for USB11A .....       | 143 |

### PL7 PRO, Modbus/TCP master configuration .....

|                                                 |     |
|-------------------------------------------------|-----|
| Process data description in transparent mode .. | 120 |
|-------------------------------------------------|-----|

### Process data exchange .....

|                                   |     |
|-----------------------------------|-----|
| Diagnostics information .....     | 121 |
| Inputs and outputs .....          | 123 |
| MOVIFIT® FC – inverter .....      | 129 |
| MOVIFIT® MC – MOVIMOT® .....      | 124 |
| MOVIFIT® SC – motor starter ..... | 127 |
| MOVIFIT® status word .....        | 121 |
| Process image .....               | 120 |

### Product names .....

### Protocol structure Modbus/TCP .....

|                                                    |     |
|----------------------------------------------------|-----|
| Header .....                                       | 106 |
| Service FC16 – Write multiple registers .....      | 108 |
| Service FC23 – Read/write multiple registers ..... | 109 |
| Service FC3 – Read holding registers .....         | 107 |
| Service FC43 – Read device identifications ..      | 110 |

## R

### Ramp

|                              |     |
|------------------------------|-----|
| Coding for MOVIFIT® FC ..... | 131 |
| Coding for MOVIMOT® .....    | 125 |

### Return code in error telegram .....

|                              |    |
|------------------------------|----|
| By EtherNet/IP™ master ..... | 89 |
| By EtherNet/IP™ slave .....  | 90 |
| Due to timeout .....         | 90 |
| General error codes .....    | 91 |
| MOVILINK®-specific .....     | 91 |

### Rights to claim under limited warranty .....

### RSLogix 5000

|                                       |    |
|---------------------------------------|----|
| Accessing device parameters .....     | 59 |
| Configuring EtherNet/IP™ master ..... | 47 |

## S

### Safety notes

|                                        |    |
|----------------------------------------|----|
| Compliance .....                       | 12 |
| Designation in the documentation ..... | 9  |
| For bus systems .....                  | 13 |
| For lifting applications .....         | 14 |



|                                                         |          |
|---------------------------------------------------------|----------|
| Functional safety .....                                 | 13       |
| General .....                                           | 12       |
| Meaning of the hazard symbols .....                     | 10       |
| Structure of embedded .....                             | 10       |
| Structure of the section-related .....                  | 9        |
| SBus                                                    |          |
| Connection of slaves .....                              | 33       |
| Data exchange MOVIFIT® – slave .....                    | 134      |
| Process image with slaves .....                         | 120      |
| Setting slave addresses .....                           | 35       |
| Section-related safety notes .....                      | 9        |
| Signal words in the safety notes .....                  | 9        |
| SMLP server                                             |          |
| Communication parameters used .....                     | 154      |
| SMPL server                                             |          |
| Configuring the communication channel .....             | 152      |
| Speed setpoint                                          |          |
| Coding for MOVIFIT® FC .....                            | 131      |
| Coding for MOVIMOT® .....                               | 125      |
| Standard gateway .....                                  | 25       |
| Startup                                                 |          |
| EtherNet/IP™ .....                                      | 46       |
| Modbus/TCP .....                                        | 93       |
| MOVIFIT® FC/SC .....                                    | 22       |
| MOVIFIT® MC .....                                       | 23       |
| Unit in MOVITOOLS® MotionStudio .....                   | 157      |
| USB11A interface adapter .....                          | 141      |
| with encoder .....                                      | 23       |
| Status LEDs MOVIFIT® unit                               |          |
| For EtherNet/IP™ and Modbus/TCP .....                   | 43       |
| General LEDs .....                                      | 37       |
| Status word                                             |          |
| MOVIFIT® FC .....                                       | 132, 133 |
| MOVIFIT® SC .....                                       | 128      |
| MOVIFIT® unit .....                                     | 121      |
| MOVIMOT® .....                                          | 125, 126 |
| Studio 5000 Logix Designer                              |          |
| Accessing device parameters .....                       | 66       |
| Accessing the 12-byte MOVILINK® parameter channel ..... | 234      |
| Accessing the S12 safety option .....                   | 219      |
| Configuring EtherNet/IP™ master .....                   | 50       |
| Configuring process data exchange .....                 | 55       |
| Subnet mask .....                                       | 25       |

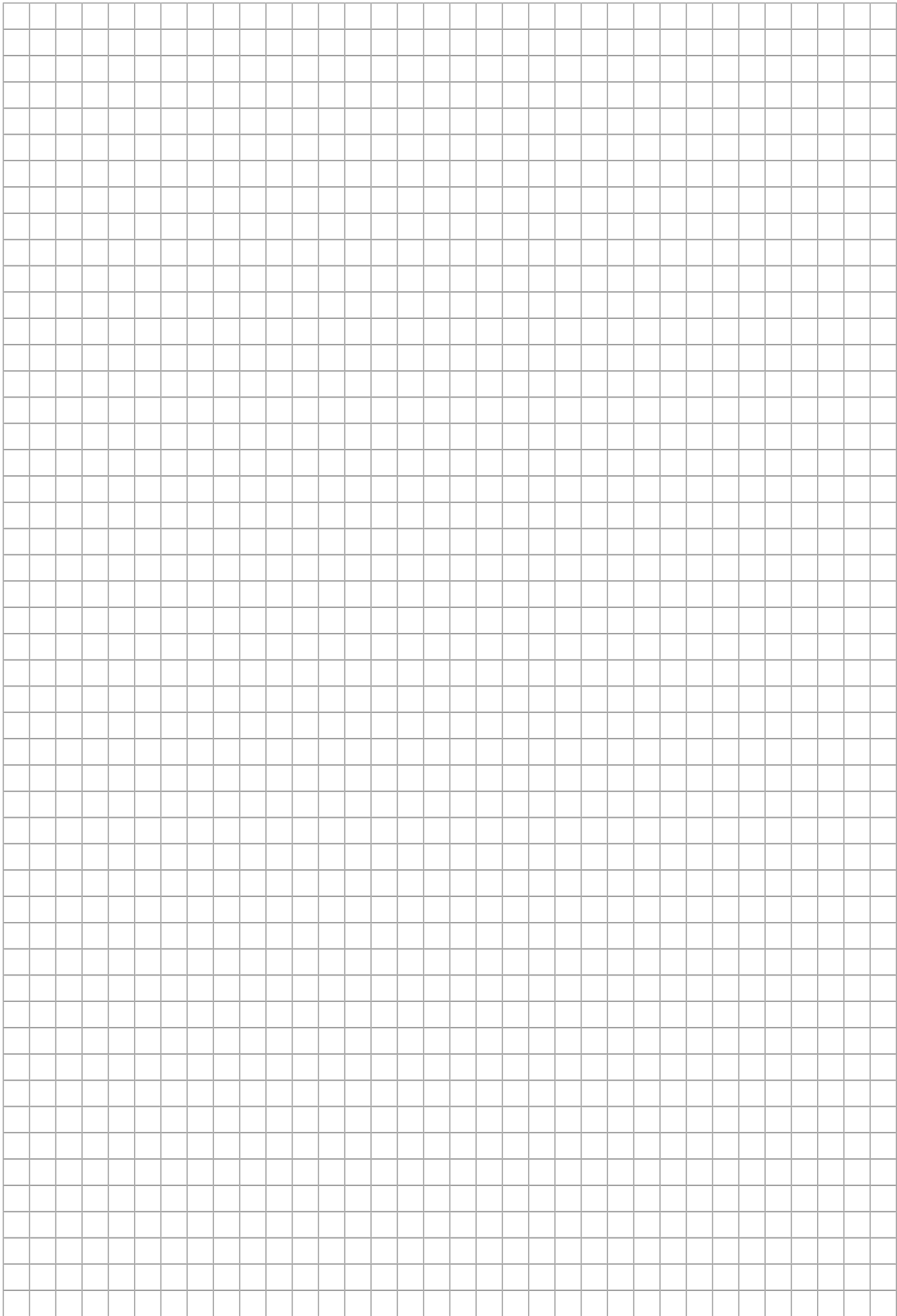
## T

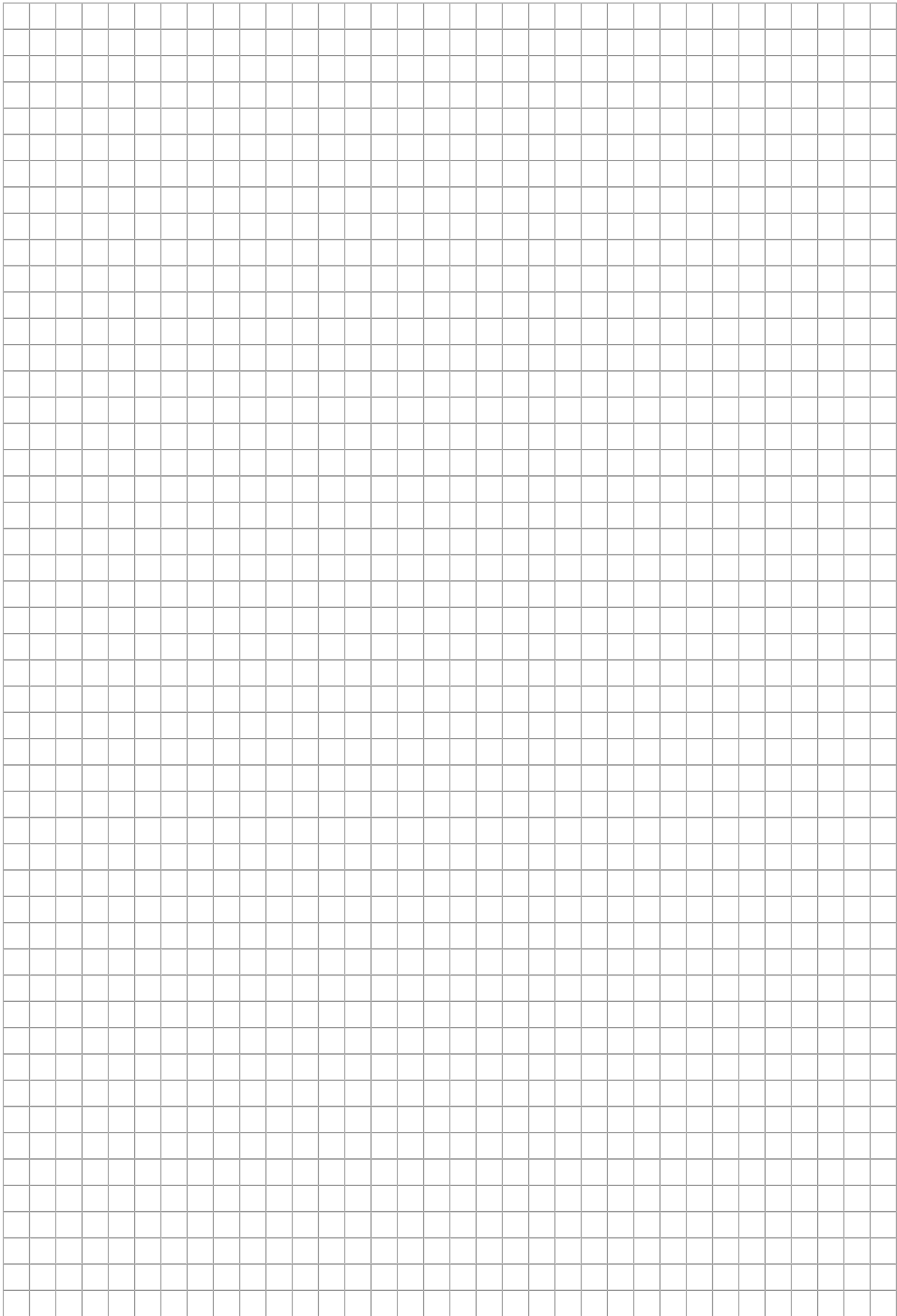
|                                                                 |               |
|-----------------------------------------------------------------|---------------|
| Target group .....                                              | 13            |
| TCP/IP protocol                                                 |               |
| Description .....                                               | 24            |
| DHCP .....                                                      | 26            |
| IP address .....                                                | 24            |
| MAC address .....                                               | 24            |
| Network class .....                                             | 25            |
| Standard gateway .....                                          | 25            |
| Subnet mask .....                                               | 25            |
| Technical data                                                  |               |
| EtherNet/IP™ interface .....                                    | 92            |
| Modbus/TCP interface .....                                      | 117           |
| Timeout behavior                                                |               |
| EtherNet/IP™ .....                                              | 75            |
| Modbus/TCP .....                                                | 112           |
| Trademarks .....                                                | 11            |
| Transparent mode                                                |               |
| Accessing the 12-byte MOVILINK® parameter channel .....         | 234           |
| Accessing the S12 safety option .....                           | 219           |
| Data exchange MOVIFIT® FC – inverter .....                      | 129           |
| Data exchange MOVIFIT® MC – MOVIMOT® .....                      | 124           |
| Data exchange MOVIFIT® SC – starter .....                       | 127           |
| Data exchange MOVIFIT® – slave .....                            | 134           |
| Designated use .....                                            | 208           |
| Diagnostics with the S12 safety option .....                    | 216           |
| Displaying the process data exchange .....                      | 212           |
| Fault diagnostics .....                                         | 239           |
| Inputs and outputs .....                                        | 123           |
| Performing an auto setup .....                                  | 211           |
| Process image .....                                             | 120           |
| Process image examples .....                                    | 214, 218, 233 |
| Starting the Gateway Configurator .....                         | 209           |
| Unit diagnostics with 12-byte MOVILINK® parameter channel ..... | 231           |
| Unit replacement .....                                          | 236           |

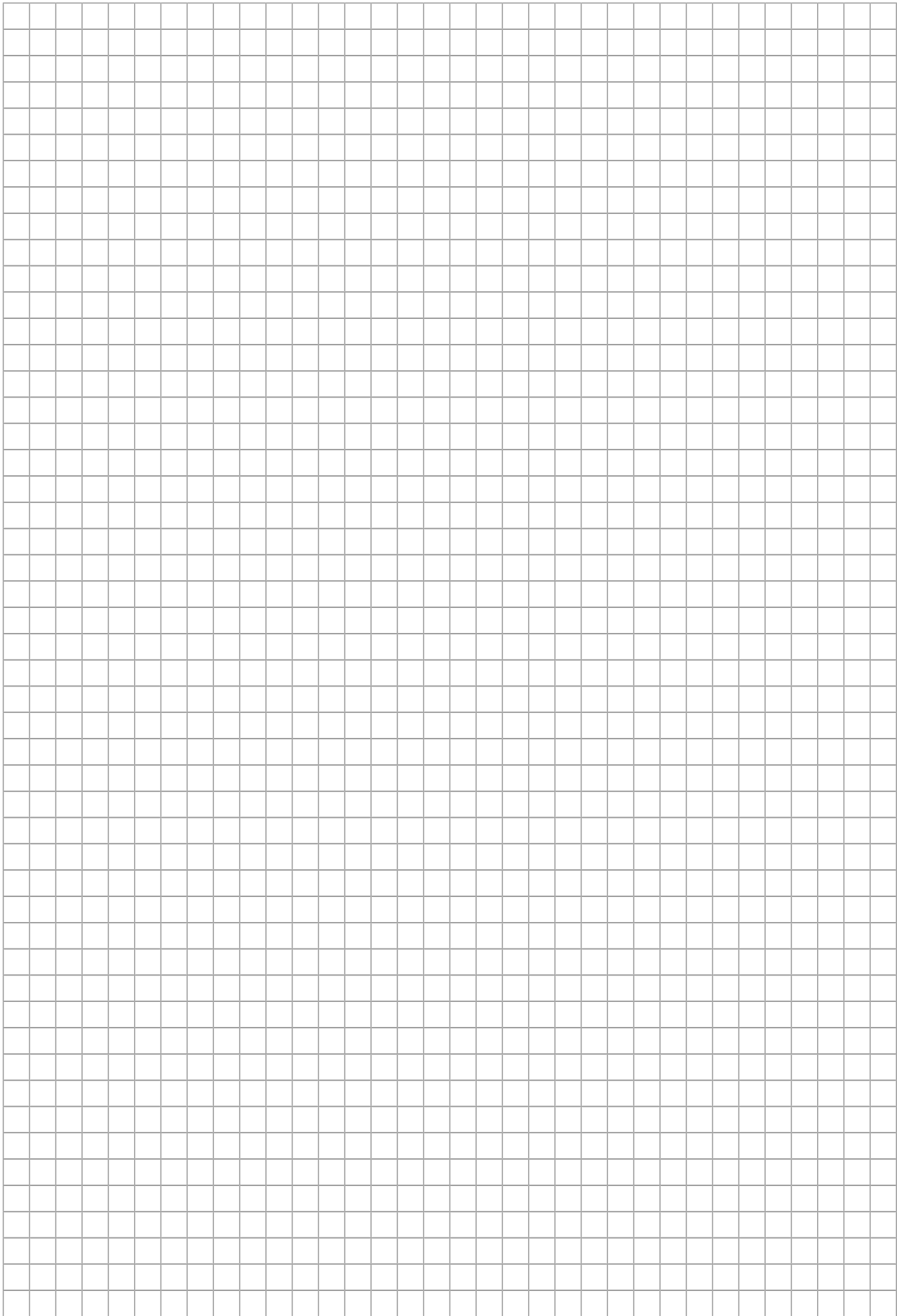
## U

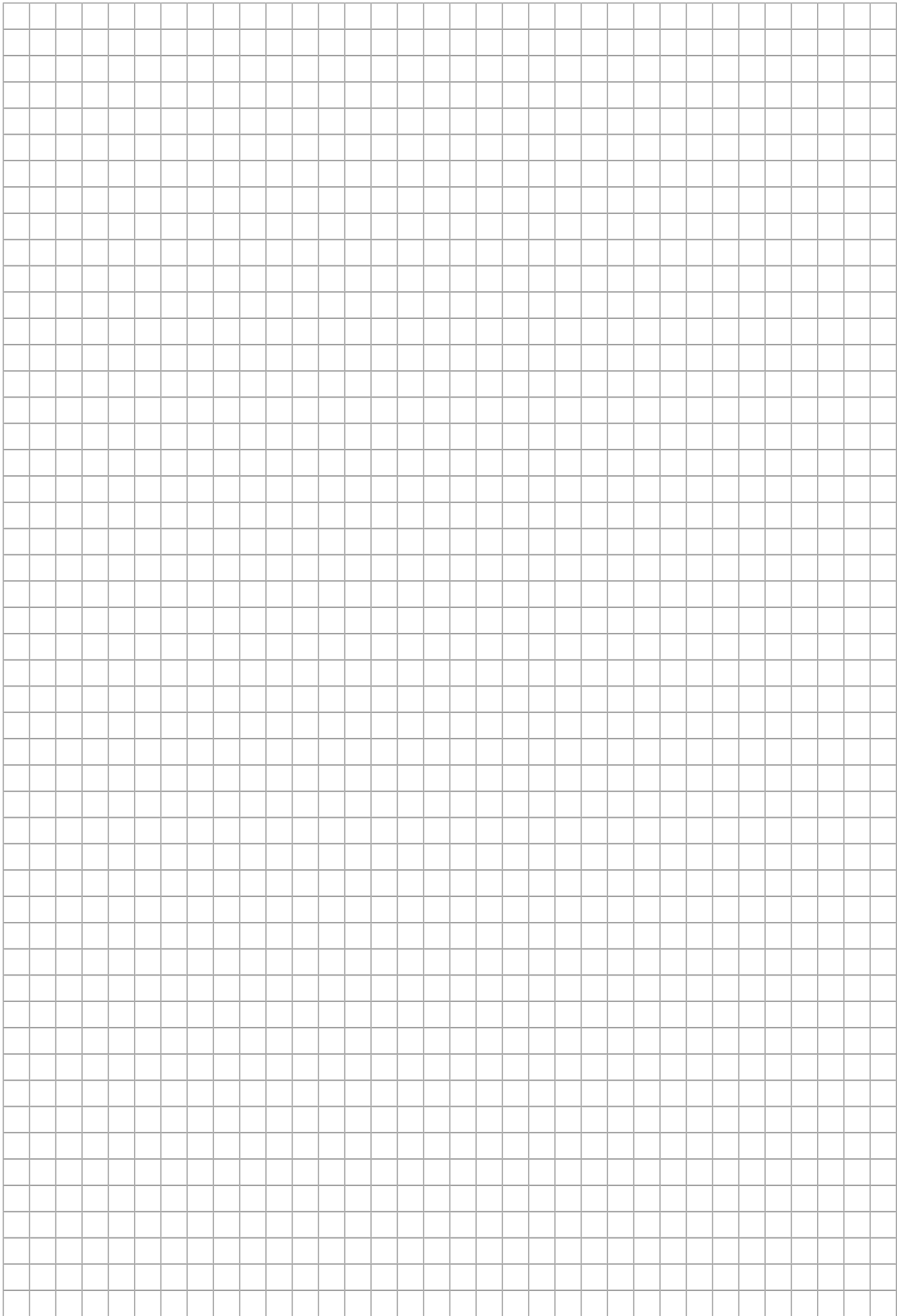
|                                                                           |     |
|---------------------------------------------------------------------------|-----|
| Unit replacement                                                          |     |
| Replacing function level "Classic" with function level "Technology" ..... | 238 |
| Replacing the same unit types .....                                       | 236 |
| USB11A                                                                    |     |
| Checking the COM port on the PC/laptop ....                               | 143 |

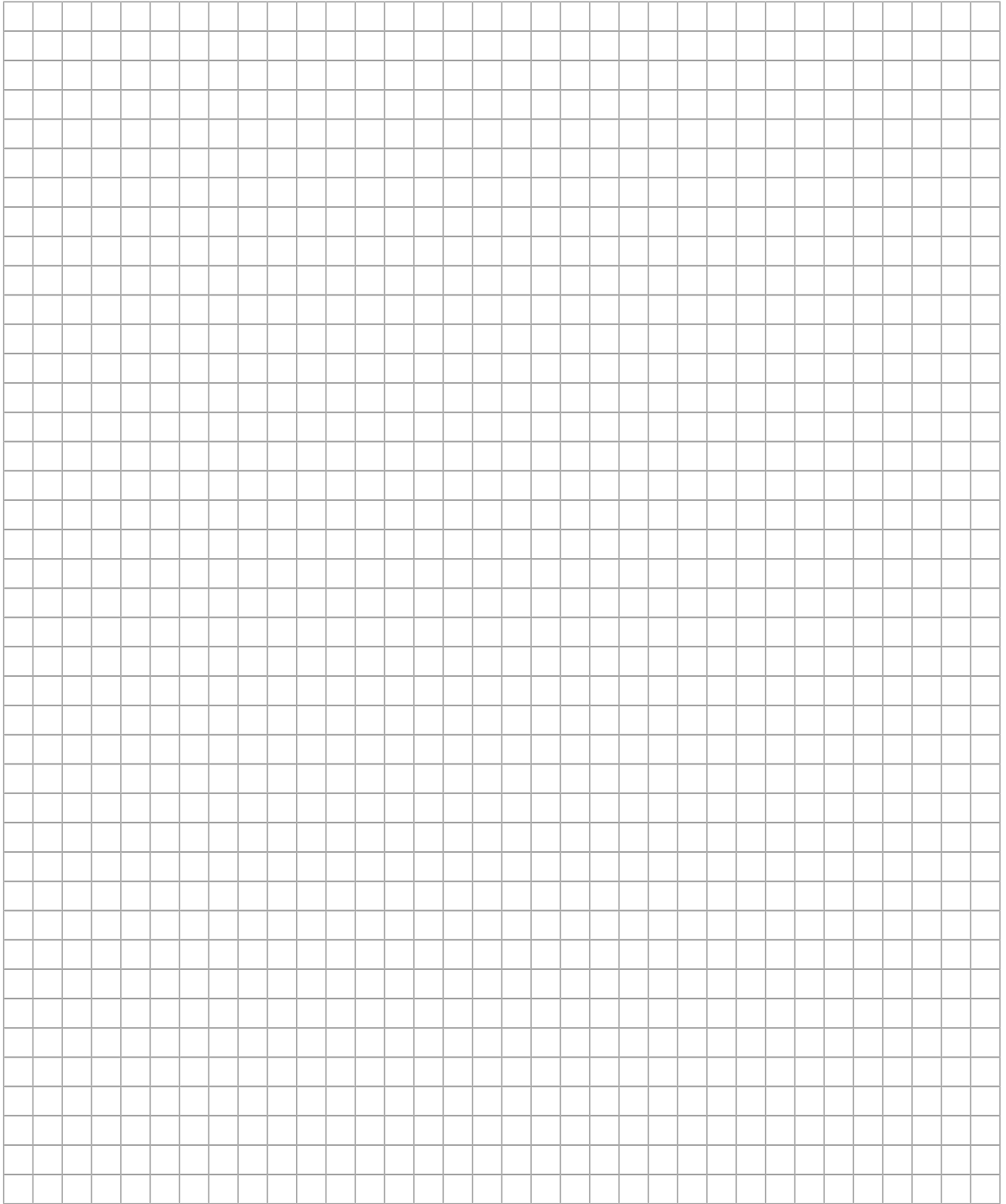
|                                         |     |                  |     |
|-----------------------------------------|-----|------------------|-----|
| Connecting a PC/laptop to the unit..... | 141 | Part number..... | 141 |
| Installing drivers on PC/laptop.....    | 143 |                  |     |













**SEW-EURODRIVE**  
Driving the world

**SEW**  
**EURODRIVE**

SEW-EURODRIVE GmbH & Co KG  
P.O. Box 3023  
76642 BRUCHSAL  
GERMANY  
Phone +49 7251 75-0  
Fax +49 7251 75-1970  
sew@sew-eurodrive.com  
→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)